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**The Future of Chemical Weapons: Implications of the Lack of Military Utility in the
Syrian Civil War**

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With chemical weapons (CW) use in Syria raising questions about the health of the CW norm, this article analyses whether the Syrian case will lead to further proliferation and use of chemical weapons by states. We argue that that significant proliferation and use is unlikely and that the norm therefore remains robust. We focus on the use of chemical weapons at Ghouta in 2013 and on the Hama Plains in 2014, and reach three conclusions. First, chemical weapons have demonstrated little military utility in Syria, either tactically or as a tool of civilian victimization. Second, the costs of use have been repeatedly demonstrated by the international reaction to their use. And third, the use of sarin, a nerve agent, has attracted a stronger international response than the use of the less lethal chlorine. We conclude that the Syrian case is unlikely to lead to significant proliferation and use of chemical weapons; any that does occur is most likely to involve states already outside the CW norm.

The conflict in Syria has reinvigorated debates over the future of chemical weapons. Some argue that the limited international response to chemical attacks in Syria has weakened the norm against chemical weapons and set the stage for further proliferation and use. They argue that more forceful international policies are needed to reinvigorate the norm and deter the use of CW.¹ Others argue that the chemical weapons norm has been maintained by the continued

¹ For example, see Rebecca Hersman, "Syria's Toxic War: Chemical Weapons are Undermining Deterrence and Proliferation," *War on the Rocks* (blog), April 26, 2016, <https://warontherocks.com/2016/04/syrias-toxic-war-chemical-weapons-are-undermining-deterrence-and-nonproliferation/>; Oliver Meier, "Syria: A Defining Moment for Chemical Weapons?" *The Bulletin of Atomic Scientists*, August 30, 2013, <http://thebulletin.org/syria-defining-moment-chemical-weapons>; Office of the Press Secretary, The White House, "Statement by the President on Syria," August 31, 2013, <https://obamawhitehouse.archives.gov/the-press-office/2013/08/31/statement-president-syria>; Edith M. Lederer, "Ban Warns of 'Weakening Taboo' as U.N. Investigates Chemical Weapons in Syria," *The Christian Science Monitor*, November 7, 2016, <https://www.csmonitor.com/World/2016/1107/Ban-warns-of-weakening-taboo-as-U.N.-investigates-chemical-weapons-in-Syria>; Emma Graham-Harrison, "Chemical Weapons Attacks in Syria May Normalise War Crimes, Experts Warn," *The Guardian*, August 11, 2016, <https://www.theguardian.com/world/2016/aug/11/syria-suspected-chlorine-gas-attack-in-aleppo-kills-woman-and-two-children>; "Chemical Weapons Use Must Not Become 'New Normal,' First Committee Speakers Warn, Issuing Calls for New Solutions to Combat Bioterrorism Threats," United Nations Meetings Coverage, First

universal condemnation of the use of CW in Syria and reinforced by the international response to the use of sarin at Ghouta and Khan Sheikhoun.²

Both sides of this debate focus on the international response to the use of CW as a key factor in the future use of CW. While we agree that the international response is important, we argue that the military utility of CW should also be considered in any discussion of whether states will acquire and use CW. Too many analysts jump from the fact that CW have been (and, at the time of writing, are being) used to a conclusion that chemical weapons have had military utility, and that significant international action is needed to outweigh that utility in order to prevent further proliferation and use.

In order to understand how the use of Syrian chemical weapons will influence the prospects of future proliferation and use, we examine the lessons states may draw from Syria about CW's military utility and the international response to CW use.³ Will government leaders look at Syria and conclude that CW have had enough military utility to compensate for the costs imposed by the international response? If so, states may reassess their current CW policies. If not, the Syrian example provides little reason to change CW policies, and thus poses little threat to the CW norm.

We recognize that a variety of factors can play a role in state decisions to acquire and use weapons, including the availability of material and technological prerequisites,

Committee, General Assembly, Seventy First Session, 14th Meeting (AM), GA/DUS.3556, October 18, 2016, <https://www.un.org/press/en/2016/gadis3556.doc.htm>.

² Richard Price, "No Strike, No Problem," *Foreign Affairs*, September 5, 2013, <https://www.foreignaffairs.com/articles/syria/2013-09-05/no-strike-no-problem>; Richard Price, "Chemical Weapons: How We Built a Taboo," *Boston Globe*, September 8, 2013, <https://www.bostonglobe.com/ideas/2013/09/08/chemical-weapons-how-built-taboo/4LmSkZpbXgLDpVYpKBOwJ/story.html>; Richard Price, "After Syria, Is There a Taboo Against the Use of Chemical Weapons?" *Washington Post*, April 7, 2017, https://www.washingtonpost.com/news/monkey-cage/wp/2017/04/07/after-syria-is-there-still-a-taboo-against-the-use-of-chemical-weapons/?utm_term=.cddf0f46847d. For Price's broader analysis of the CW taboo, see Richard Price, *The Chemical Weapons Taboo* (Ithaca: Cornell University Press, 2000). The universal condemnation of the use of CW throughout the Syrian war means that the legitimacy of the CW taboo has not been called into question. (The torture norm is a contrasting case; see Ryder McKeown, "Norm Regress: US Revisionism and the Slow Death of the Torture Norm," *International Relations* 23, no. 1 (2009): 5-25.)

³ Due to space limitations, we limit our analysis to state actors.

perceptions of security and threats, the status associated with and the possible political utility of weapons, the personality of leaders, domestic politics, and regime type.⁴ However, both military utility and international response are widely accepted as key factors that influence the proliferation and use of weapons.⁵

Examining these two key factors, we find little reason to fear that the Syrian case will lead to further significant proliferation and use of chemical weapons. This is the case for three key reasons. First, our analysis shows that chemical weapons have demonstrated little military utility in Syria, either tactically or as a tool of civilian victimization. Second, the potential costs of use have been demonstrated by the international response, including the universal condemnation of CW use by states and the coercion that resulted in Syria's membership in the CWC.⁶ And third, the use of sarin, a nerve agent with greater lethality, has attracted a stronger international response than the use of the relatively less lethal chlorine.⁷

⁴ The literature on the drivers of proliferation is voluminous, though it is largely focused on nuclear weapons. See, for example, Dana P. Eyre and Mark C. Suchman, "Status, Norms, and the Proliferation of Conventional Weapons: An Institutional Theory Approach" in *The Culture of National Security: Norms and Identity in World Politics* ed. Peter J. Katzenstein (New York, Columbia University Press, 1996), 79-113; Jacques E.C. Hymans, "Theories of Nuclear Proliferation," *The Nonproliferation Review* 13, no. 3 (2006): 455-465; William C. Potter and Gaukhar Mukhatzhanova, "The Role of Theory: An Introduction" in *Forecasting Nuclear Proliferation in the 21st Century: Volume 2 A Comparative Perspective*, eds. William C. Potter and Gaukhar Mukhatzhanova (Stanford: Stanford University Press, 2011), 1-12; Scott D. Sagan, "The Causes of Nuclear Weapons Proliferation," *Annual Review of Political Science*, 17 (March 2011): 225-241. On chemical weapons proliferation, see Gregory D. Koblentz, "Regime Security: A New Model for Understanding the Proliferation of Chemical and Biological Weapons," *Contemporary Security Policy*, Vol. 34, No. 3 (December 2013): 501-525; Edward M. Spiers, "Proliferation Incentives, Supplies and Controls" in *Chemical and Biological Weapons: A Study of Proliferation* (London: Palgrave Macmillan UK, 1994), 42-64.

⁵ The "security driver" for proliferation assumes that weapons are useful for addressing security threats; see Scott D. Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security* 21, no. 3 (1996/1997): 54-86 and the Office of Technology Assessment, *Proliferation of Weapons of Mass Destruction: Assessing the Risks* (Washington: US Government Printing Office, 1993), 55. Both constructivists and realist thinkers see the international response to an incidence of weapons use as influencing the likelihood of future use. For constructivists, this is because the response to the violation of a norm plays an important role in maintaining the norm; for example, see Friedrich Kratochwil and John Gerard Ruggie, "International Organization: A State of the Art on an Art of the State," *International Organization* 40, no. 4 (1986): 767; see also 768. For realists using a consequentialist logic, this is because the international response can impose costs that may outweigh the gains of weapons use and the possibility of a similar response in the future may deter use.

⁶ Note that not even Islamic State (IS) has claimed responsibility for the use of CW. See Charles R. Lister, *The Syrian Jihad: Al-Qaeda, the Islamic State and the evolution of an insurgency* (Oxford: Oxford University Press, 2016), 379-380.

⁷ According to the Acute Exposure Guidelines provided by the Center for Disease Control, for a 10 minute exposure to chlorine dispersed in air to reach level 3 (life-threatening effects or death), the agent concentration must be 50 parts per million (ppm); to reach the same level for the same length of exposure, the

We thus conclude that the Syrian case is unlikely to lead to significant proliferation and use of CW; if the Syrian case inspires any acquisition and use, it is most likely to involve a relatively basic CW capability in the hands of states who are already outside the norm.

Our argument proceeds in three steps. First, we present the analytic framework we use to evaluate the costs and benefits of CW use in Syria, focusing on the military utility of CW and the international response to CW use. Second, we analyze two cases, Ghouta in August 2013 and the Hama Plains in 2014, looking first at tactical utility and then at utility as a tool of civilian victimization. Third, we recognize that despite our finding that in these cases chemical weapons had little military utility, the regime has continued to use them. We therefore examine more recent developments to see if these challenge our findings from the earlier cases.

We are conscious of the fact that the war in Syria is on-going. From our perspective in 2018, it is clear that one set of lessons could have been drawn in October 2013, after Syria joined the Chemical Weapons Convention and agreed to disarm; another set in April 2014 in the wake of allegations that the Syrian regime used chlorine barrel bombs in attacks on the Hama Plains; still another set in April 2017, when the United States launched cruise missiles at Shayrat airbase in response to nerve agent use on Khan Sheikhoun; and yet another set in November 2017, with the deadlock in the Security Council on the investigation of CW attacks in Syria. Further evolution of the conflict can only be expected. However, we do not expect that evolution to produce a challenge to our arguments, because the sustained use of

agent concentration of sarin must be only 0.064ppm. By this metric, sarin is nearly three orders of magnitude more lethal. See National Institute for Occupational Safety and Health (NIOSH) Education and Information Division, "SARIN (GB): Nerve Agent," *Emergency Response Safety and Health Database*, last updated November 8, 2017, https://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750001.html and National Institute for Occupational Safety and Health (NIOSH) Education and Information Division, "CHLORINE: Lung Damaging Agent," *Emergency Response Safety and Health Database*, last updated November 9, 2017, https://www.cdc.gov/niosh/ershdb/emergencyresponsecard_29750024.html. Note that factors such as defensive equipment and the mechanisms of delivery and dissemination can also affect the lethality of a CW attack.

more advanced CW will continue to be constrained by the threat of a strong international response.

ANALYTIC FRAMEWORK

In order to understand whether the Syrian case will spur further CW proliferation and use, it is necessary to analyze the military utility of CW in the Syrian conflict as well as the international response to its use. Here we present our framework for doing so, first developing our approach to examining the military utility of chemical weapons. We then explain how we examine the international response, our case selection, and our sources. The next section then applies this framework to the cases of Ghouta and the Hama Plains.

The concept of ‘military utility’ is central to international relations and security studies, yet efforts to define and develop the concept are few and far between. The literature that does exist has identified different types of military; for example, Susan Martin distinguishes between technical, tactical and strategic utility in a discussion of CBN weapons.⁸ We also know that the effectiveness of a weapon can vary in a variety of ways. For example, characteristics of the target and environmental factors can influence the effects of a particular use of a weapon, and Stephen Biddle has shown that the training and proficiency of troops plays an important role in the contribution a weapon makes to military operations.⁹ But our question is not what the use of CW in Syria tells us about the general utility of CW; our question is whether the use of CW in Syria provides new information that will change states’ calculus about nuclear weapons. In order to change states’ current CW policies and spur acquisition and/or use of chemical weapons in the future, the Syrian case needs to

⁸ See Susan B. Martin, “Norms, Military Utility, and the Use/Non-use of Weapons: The Case of Anti-plant and Irritant Agents in the Vietnam War,” *Journal of Strategic Studies* 19, no. 3 (2016): 321-364. For other discussions of the military utility of chemical weapons, see Joachim Krause, “The Military Utility of Chemical Weapons in Current Warfare,” *The International Spectator* 26, no. 2 (1991): 85-99 and Victor A. Utgoff, *The Challenge of Chemical Weapons: An American Perspective* (Basingstoke: Macmillan, 1990).

⁹ See Stephen Biddle, *Military Power: Explaining Victory and Defeat in Modern Battle* (Princeton: Princeton University Press, 2006).

demonstrate that states have more to gain, or less to lose, from chemical weapons than previously thought.¹⁰ Only if this is the case does the Syrian case pose a threat to the CW norm.

Because of the nature of the Syrian conflict, we focus on two types of military utility: tactical military utility and utility as a weapon of civilian victimization. To develop our indicators of tactical military utility we use the literature on the proliferation and use of chemical weapons.¹¹ While much of the literature on CW proliferation and use is based on the Cold War, it includes more recent work on their role in “new wars” and in civil conflicts.¹²

¹⁰ According to the OPCW, 192 states are currently members of the CWC. See ‘About OPCW,’ <https://www.opcw.org/about-opcw/> (accessed February 16, 2018). Note that Syria was not a member of the Chemical Weapons Convention and had an existing stockpile of chemical weapons when the civil war broke out. The four states who are not party to the CWC today are Egypt, the DPRK, South Sudan (who announced in December 2017 that it is joining the convention) and Israel (who has signed but not ratified the treaty). The DPRK is widely believed to possess a significant CW capability. See Joseph S. Bermudez, Jr., “North Korea’s Chemical Warfare Capabilities,” *38 North*, October 13, 2013, <https://www.38north.org/2013/10/jbermudez101013/>; see also Ministry of National Defense, Republic of Korea, “2016 Defense White Paper,” http://www.mnd.go.kr/user/mndEN/upload/pblicitn/PBLICTNEBOOK_201705180357180050.pdf.

¹¹ In this literature the focus is on the utility of CW on the battlefield (tactical utility) as well as on the utility of CW as a strategic deterrent. Examples here include Gordon M. Burck and Charles C. Flowerree, *International Handbook on Chemical Weapons Proliferation* (Westport, CT: Greenwood Press, 1991); John Cookson and Judith Nottingham, *A Survey of Chemical and Biological Warfare* (New York: Monthly Review Press Classics, 1969); Anthony H. Cordesman and Abraham R. Wagner, *The Iran-Iraq War*, vol. 2 of *The Lessons of Modern War* (Boulder, CO: Westview, 1991), 506-18; Anthony H. Cordesman, *Weapons of Mass Destruction in the Middle East* (Centre for Strategic and International Studies, September 2000), <https://www.csis.org/analysis/weapons-mass-destruction-middle-east-0>; D. Hank Ellison, *Chemical Warfare during the Vietnam War: Riot Control Agents in Combat* (London: Routledge, 2010); Joost R. Hiltermann, *A Poisonous Affair: America, Iraq and the Gassing of Halabja* (Cambridge: Cambridge University Press, 2007); Kai Ilchmann and James Revill, “Chemical and Biological Weapons in the ‘New Wars,’” *Science and Engineering Ethics* 20, no. 3 (September 2014): 753-767; Efraim Karsh, “The Iran-Iraq War: A Military Analysis,” *Adelphi Papers*, 27, no. 220 (1987); Koblenz, “Regime Security;” Krause, “Military Utility;” Thomas L. McNaughton, “Ballistic Missiles and Chemical Weapons: The Legacy of the Iran-Iraq War,” *International Security* 15, no. 2 (Autumn 1990): 5-34; Edward M. Spiers, “The Role of Chemical Weapons in the Military Doctrines of Third World Armies” in *Security Implications of a Global Chemical Weapons Ban*, ed. J. Krause (Boulder, CO: Westview Press, 1991), 41-62; Edward M. Spiers, *Chemical Weaponry: A Continuing Challenge* (Basingstoke: Palgrave Macmillan, 1989); Edward M. Spiers, *Chemical and Biological Weapons: A Study of Proliferation* (New York: St. Martin’s Press, 1994); Edward M. Spiers, *A History of Chemical and Biological Weapons* (London: Reaktion Books, 2010); Stockholm International Peace Research Institute (SIPRI), *The Rise of CB Weapons*, vol. 1 of *The Problem of Chemical and Biological Warfare* (Stockholm: Almqvist and Wiksell, 1971); W. Andrew Terrill, “The Chemical Warfare Legacy of the Yemen War,” *Comparative Strategy* 10, 2 (1991): 109-119; and Utgoff, *Challenge of Chemical Warfare*.

¹² For example, Ilchmann and Revill, “New Wars;” Koblenz, “Regime Security;” and Glenn Cross, *Dirty War: Rhodesia and Chemical and Biological Warfare, 1975-1980* (Solihull, UK: Hellion and Company, 2017). But the use of CW in “asymmetric” conflicts is not new. In addition to the Rhodesian case, examples

Based on past cases of use and on the characteristics of CW, this literature suggests that in both international and intra-state conflicts, chemical weapons can a) kill or injure large numbers of unprotected troops and/or civilians; b) affect large areas, including targets within those areas that one cannot identify precisely; c) deny territory by preventing an adversary from occupying or crossing an area of land; d) reach otherwise invulnerable targets by penetrating tunnels, caves and other fortifications, including in urban warfare; e) terrorize troops and civilians, undermining morale; f) impose large logistical and operational challenges, e.g. chemical defenses and decontamination or medical care; and g) help to maintain operations in the face of logistical difficulties, including shortages of conventional weapons. In all these roles, chemical weapons are most effective against targets that lack chemical defensive equipment. Against protected troops, the main effect of chemical attacks is to slow down and complicate operations. Generally, then, in military operations the utility of chemical weapons stems from their role in taking and holding territory, attacking large area targets, and in defeating unprotected opponents by killing, incapacitating, or terrorizing them.¹³

Since the allegations that chemical weapons were being used began in 2012, various arguments have been made about the tactical use of CW in the Syrian conflict.¹⁴ As early as June 2013, Julian Perry Robinson describes use in Syria as involving “pinpoint targeting” and

include the Spanish use of CW against Rif rebels in Morocco in the 1920s, Italy’s use in Abyssinia in the 1930s, and Egypt’s use in Yemen in the 1960s.

¹³ Specific characteristics of chemical weapons are often highlighted: For example, with a diversified chemical arsenal, it is possible to tailor the agent to the desired effect, ranging from incapacitating to lethal and from non-persistent to persistent, and when used in isolation from high explosives, chemical weapons leave infrastructure undamaged. Furthermore, chemical attacks made by air, missile or artillery can eliminate the need for resource-intensive ground operations, and protection against chemical attacks can be challenging because it requires special equipment and training.

¹⁴ See, for example, Dan Kaszeta, “Why Chlorine Gas Has Returned in Syria and Iraq,” *Cicero Magazine*, April 15, 2015, <http://www.ciceromagazine.com.php56-15.dfw3-1.websitetestlink.com/features/why-chlorine-gas-has-returned-in-syria-and-iraq/>; Julian Perry Robinson, “Alleged Use of Chemical Weapons in Syria,” *Harvard Sussex Program Occasional Paper*, Issue 4 (June 26, 2013); and Richard Weitz, “Syria and Beyond: The Future of the Chemical Weapons Threat,” *Proliferation Papers* 51 (IFRI Security Studies Center, December 2014), <https://www.ifri.org/en/publications/enotes/proliferation-papers/syria-and-beyond-future-chemical-weapons-threat#sthash.mO7BZ9O2.dpbs>.

recurrent “limited agent releases evidently aimed at disabling, not necessarily, killing, enemy combatants.”¹⁵ While Robinson points out that this “is quite different from the mass-killing wide-area-effect narratives that dominate the history of poison-gas warfare,” he quotes from a “seemingly knowledgeable defector” who states that “the intention was to incapacitate rebels and force them out of strategic areas, while keeping deaths among their ranks limited.”¹⁶ If accurate, the idea is still that chemical weapons have tactical utility in that they help take and/or hold territory.

To examine whether chemical weapons have had tactical utility in Syria, we first situate each case of use within the overall war and current events on the ground. We then looked for evidence of the effects discussed in the literature on CW proliferation and use—primarily whether CW contributed to taking and holding territory but also whether it resulted in a large number of casualties and whether there is broader evidence of military impact. Specifically, for each case we sought information on the number of casualties, whether there were changes in control of territory, whether there was a shift in the momentum of the fighting, and whether there is evidence that chemical weapons undermined morale. We also examined the international reaction to the attack and whether that may have affected military utility, by limiting follow-up actions. Here we recognize that in addition to its direct impact on the costs and benefits of CW use, international reaction can also have an indirect impact on military utility. This is the case if the reaction to an attack inhibits follow-on CW attacks and other military actions. It can also indirectly affect military utility if an attacker deliberately limits an attack in an attempt to avoid an international reaction.

As discussed above, the CW literature also argues that chemical weapons have been used to kill, incapacitate or terrorize unprotected populations. We use the literature on the

¹⁵ Robinson, “Alleged Use,” 3 and 35.

¹⁶ *Ibid.*, 35.

targeting of civilians in war in order to generate indicators for the military utility of CW as a tool of civilian victimization. This literature understands civil war as a competition for the support of, or control over, population, and it argues that the targeting of civilians is often a strategy of desperation, the best of bad choices.¹⁷ The aim of civilian targeting is understood to be preventing civilians from helping the other side by directly killing them, by killing some as a deterrent, or by convincing civilians to flee.¹⁸

CW can serve a strategy of civilian victimization either through their ability to kill and injure large numbers of unprotected civilians or through their psychological effects on both fighters and civilian populations.¹⁹ According to Joost Hiltermann, the latter was a key purpose of the Iraqi use of CW against the Kurds, including the attack on Halabja, where chemical weapons were used “to cause panic and to undermine popular support for continued fighting.”²⁰ Hiltermann argues that reports of civilian casualties from gas also destroyed the morale of the insurgents themselves. For example, he quotes a Kurdish (PUK) commander,

¹⁷ See, for example, Alexander B. Downes, *Targeting Civilians in War* (Ithaca, NY: Cornell University Press, 2007), 29-35, 423; Stathis N. Kalyvas, “Wanton and Senseless? The Logic of Massacres in Algeria,” *Rationality and Society* 11, no. 3 (August 1999): 251; Benjamin Valentino, Paul Huth, and Sarah Croco, “Covenants without the Sword: International Law and the Protection of Civilians in Times of War,” *World Politics* 58, no. 3 (April 2006): 340, 350-1.

¹⁸ See Downes *Targeting Civilians*; Alexander B. Downes, “Draining the Sea by Filling the Graves: Investigating the Effectiveness of Indiscriminate Violence as a Counterinsurgency Strategy,” *Civil Wars* 9, no. 4 (December 2007): 420-444; Benjamin Valentino, Paul Huth, and Dylan Balch-Lindsay, “‘Draining the Sea’: Mass Killing and Guerrilla Warfare,” *International Organization* 58, no. 2 (Spring 2004): 375-407; Kalyvas, “Wanton and Senseless,” Stathis N. Kalyvas, “The Paradox of Terrorism in Civil War,” *The Journal of Ethics* 8, no. 1 (March 2004): 97-138.

¹⁹ The chemical attack at Ghouta demonstrated the ability of sarin to kill large numbers of people; other allegations—of the use of sarin, mustard, and chlorine—have involved much smaller numbers of casualties. However, commentators such as de Breton-Gordon have stressed the suitability of chlorine as a psychological terror weapon regardless of its material effects, and work on PTSD in both veterans and civilian victims of CW suggest that these effects can be long lasting. See Hamish de Breton-Gordon, “Remembering Halabja Chemical Attack: Chemical Weapons are the Ultimate Psychological Weapon for Those Who Are Willing to Use Them,” *Aljazeera*, March 16, 2016, <http://www.aljazeera.com/indepth/opinion/2016/03/remembering-halabja-chemical-attack-160316061221074.html>; Julian D. Ford, Paula P. Schnurr, Matthew J. Friedman, Bonnie L. Green, Gary Adams and Steve Jex, “Posttraumatic Stress Disorder Symptoms, Physical Health and Health Care Utilization 50 Years After Repeated Exposure to a Toxic Gas,” *Journal of Traumatic Stress*, 14, no. 3 (June 2004): 185-194; Farnoosh Hashemian, Kaveh Khoshnood, Mayur M. Desai, Farahnaz Falahati, Stanislav Kasl, and Steven Southwick, “Anxiety, Depression and Posttraumatic Stress in Iranian Survivors of Chemical Warfare,” *JAMA* 296, no. 5 (August 2, 2006): 560-566. We thank one of our anonymous reviewers for suggesting the point about PTSD.

²⁰ Hiltermann, *A Poisonous Affair*, 13.

who explained, “We were not defeated militarily in Halabja, but we didn't want to cause even more casualties, especially among civilians.”²¹

The use of CW is argued to be particularly terrifying for a variety of reasons, including their greater unfamiliarity, the dull thud on landing that can give a misleading sense of security, and/or the mechanism of harm (e.g. suffocation).²² Their impact on morale may also be due to the fact that they make the strategies developed by civilians to deal with conventional bombs, such as seeking shelter underground, counterproductive. Because sarin and chlorine gas are heavier than air, these chemical agents sink to low-lying places such as basements, turning what was a place of safety into a place of hazard and potential death. As a strategy of civilian victimization, then, the question is whether the use of chemical weapons in Syria has inhibited the ability of rebels to operate by decreasing civilian support, either through depopulation or undermining morale.²³

In analyzing the use of CW in Syria, it is necessary to distinguish between different kinds of chemical weapons capabilities. A chemical weapon is composed of the chemical agent, the munition, and the delivery and dissemination systems. Chemical weapons capabilities span a spectrum that varies across these aspects and ranges from a ‘basic capability’ at one end to an ‘advanced capability’ at the other. For example, a CW capability composed of improvised/commercially available agents and rudimentary dispersal and delivery systems would be at the ‘basic’ end of the spectrum, whereas a capability composed

²¹ Ibid., 129; see also 106; 129-135; see also Joost Hiltermann, “Chemical Wonders: Review of The Iran-Iraq War by Pierre Razoux,” *London Review of Books*, 38, no. 3 (February 4, 2016): 3-6, <https://www.lrb.co.uk/v38/n03/joost-hiltermann/chemical-wonders>. He argues here that “the Iraqi army couldn't have been as successful as it was in dislodging Kurdish villagers, who had grown inured to constant shelling and air attacks, had events at Halabja not sent a powerful message as to what might befall them if they stayed. After Halabja, as chemical clouds wafted down in selective locations during the Anfal campaign, the merest rumor or hint of a gas attack would be enough to send people running, just as the army intended.”

²² See John Knefel, “The Trauma of Chemical Warfare Continues to Terrorize Syrians,” *The Nation*, April 1, 2006, available at: <https://www.thenation.com/article/the-trauma-of-chemical-warfare-continues-to-terrorize-syrians/>.

²³ As is widely recognized in the civilian targeting literature, such coercive strategies risk alienating civilians and increasing support for the other side; this potential is one reason why civilian targeting is seen as a strategy of desperation.

of nerve agents and sophisticated dispersal and delivery systems would be on the ‘advanced’ end.

In our examination of the international response, we look at both the rhetoric and actions of individual states as well as international organizations. The debate about the adequacy of the international response has focused on both condemnation and on the (possible) use of force, and we do the same here. There is a larger argument to be made about the international response, which would include the use and limits of sanctions, the threat of war crimes prosecution, the efforts of some states to block UNSC action, the role of competing international norms (e.g. state sovereignty), and the role of the OPCW (including the destruction of Syria’s declared chemical weapons arsenal, the authorization of a mechanism to attribute responsibility for the use of CW, and the efforts to undermine the authority and credibility of its investigations). While these are all important issues that deserve further analysis, the most salient issues for states contemplating the acquisition or use of CW will be the likelihood of ostracization and/or the use of force.

We focus on two cases, the 2013 use of sarin at Ghouta and the summer 2014 chlorine attacks on the Hama Plains, for several reasons. First, both of these incidents were widely discussed by traditional and social media as well as NGOs and governments, which means that they will be salient for other actors looking to draw lessons about the utility of chemical weapons, and are therefore significant in thinking about the future of chemical weapons use. Second, both have been the subject of international investigations that substantiated these attacks and provided credible information on them. In addition, the two cases offer variation in the type of CW used, allowing us to investigate the use of a more advanced chemical weapons capability, with sarin delivered by rocket in the case of the Ghouta attack, and a more basic CW arsenal — the use of chlorine barrel bombs dropped from helicopters -- in the

case of the Hama Plains.²⁴ It is not possible to analyze all cases of use or even to focus on a representative or random sample, because the universe of cases is poorly defined, and very limited information is available for most of them. For example, by September 2016 the Syrian American Medical Society (SAMS) had identified 167 alleged cases of use, with the UN and FFM investigating only a subset of those.²⁵

Syria itself requested a UN investigation into allegations of CW use in March 2013.²⁶ As a result, the UN Secretary-General's Mechanism for Investigation of Alleged Use of Chemical and Biological Weapons was activated and began its work in Syria on August 19, 2013. The Mission reported on early incidents of sarin use and the 2013 Ghouta attack, but did not provide attribution.²⁷ This mission was concluded in December 2013, after UNSCR

²⁴ The Ghouta attack involved short-range, ground-launched rockets. See Human Rights Watch, "Attacks on Ghouta: Analysis of Alleged Use of Chemical Weapons in Syria," September 10, 2013, <https://www.hrw.org/report/2013/09/10/attacks-ghouta/analysis-alleged-use-chemical-weapons-syria>; Eliot Higgins, "Volcanoes in Damascus," *Bellingcat*, July 15, 2014, <https://www.bellingcat.com/resources/case-studies/2014/07/15/volcanoes-in-damascus/>. The attacks on the Hama Plains involved chlorine barrel bombs delivered by helicopter. See "The Third Report of the Organization for the Prohibition of Chemical-Weapons-United Nations Joint Investigative Mechanism," August 24, 2016, UNSC S/2016/738, 9-12, http://www.un.org/en/ga/search/view_doc.asp?symbol=S/2016/738; see also Torie Rose DeGhett, "The Build-It-Yourself Bombs," *Foreign Policy*, July 3, 2014, <http://foreignpolicy.com/2014/07/03/the-build-it-yourself-bombs>, and Eliot Higgins, "A Brief Open Source History of the Syrian Barrel Bomb," *Bellingcat*, March 24, 2015, <https://www.bellingcat.com/news/mena/2015/07/08/a-brief-open-source-history-of-the-syrian-barrel-bomb/>.

²⁵ See SAMS, "167th Chemical Weapons Use in Syria Reported in Besieged Eastern Aleppo City," September 6, 2016, https://www.sams-usa.net/press_release/press-release-167th-chemical-weapons-use-syria-reported-besieged-eastern-aleppo-city/; see also SAMS, "Table of Chemical Attacks in Syria" in "A New Normal: Ongoing Chemical Weapons Attacks in Syria," February 2016, 52-56, https://www.sams-usa.net/wp-content/uploads/2016/09/A-New-Normal_Ongoing-Chemical-Weapons-Attacks-in-Syria.compressed.pdf; Robinson, "Alleged Use," 34; The Syrian Archive, "Violation Database," <https://syrianarchive.org/en/database/>; and "Report of the Independent International Commission of Inquiry on the Syrian Arab Republic," August 8, 2017, A/HRC/36/55, <http://undocs.org/A/HRC/36/55>. For the cases investigated by the United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic and by the OPCW Fact-Finding Mission, see, "United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic: Final Report," December, 2013, <https://unoda-web.s3.amazonaws.com/wp-content/uploads/2013/12/report.pdf> and OPCW Fact-Finding Mission Reports, <https://www.opcw.org/special-sections/syria/fact-finding-mission-reports>.

²⁶ "UN Chief Announces Independent Probe into Allegations of Chemical Attack in Syria," UN News Centre, March 21, 2013, <https://www.un.org/apps/news/story.asp?NewsID=44450#.Wk-MBFVl-iw>.

²⁷ See "Report of the United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic on the Alleged Use of Chemical Weapons in the Ghouta Area of Damascus on 21 August 2013," A/67/997-S/2013/553, September 16, 2013, http://www.securitycouncilreport.org/atf/cf/%7B65BFCF9B-6D27-4E9C-8CD3-CF6E4FF96FF9%7D/s_2013_553.pdf and "United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic: Final Report."

2118 endorsed the “Framework for Elimination of Syrian Chemical Weapons.”²⁸ The resumption of CW allegations led to the Organisation for the Prohibition of Chemical Weapons (OPCW) Fact Finding Mission (FFM). It was announced in April 2014, with a mandate to establish whether CW were used rather than to identify who used them.²⁹ After an attack on OPCW FFM inspectors on May 27, 2014 near Kafr Zita, subsequent investigatory work (such as interviews) has primarily been conducted remotely.³⁰

After chlorine incidents continued into 2015, the UN-OPCW Joint Investigative Mechanism (JIM) was established by UNSCR 2235 in August 2015 in order to identify those responsible for cases of CW use that had been substantiated by the FFM.³¹ Thus far, the JIM has attributed six CW incidents: four to the Syrian regime and two to Islamic State.³² In addition, in January 2018 it was reported that samples of the CW agent used at Ghouta in August 2013, at Khan Al-Assal in March 2013, and at Khan Sheikhoun on April 4, 2017

²⁸ See the “Joint National Paper by the Russian Federation and the United States of America, Framework for the Elimination of Syrian Chemical Weapons,” EC-M-33/NAT.1, September 17, 2013, https://www.opcw.org/fileadmin/OPCW/EC/M-33/ecm33nat01_e_.pdf.

²⁹ “Summary Report of the Work of the OPCW Fact-Finding Mission in Syria Covering the Period from 3 to 31 May 2014,” June 16, 2014, S/1191/2014, https://www.opcw.org/fileadmin/OPCW/S_series/2014/en/s-1191-2014_e_.pdf.

³⁰ “Third Report of the OPCW Fact-Finding Mission in Syria,” December 18, 2014, UNSC S/1230/2014, 3, https://www.opcw.org/fileadmin/OPCW/Fact_Finding_Mission/s-1230-2014_e_.pdf.

³¹ On the Joint Investigative Mechanism, see “Fact Sheet: OPCW-UN Joint Investigative Mechanism,” January 2017, <https://unoda-web.s3-accelerate.amazonaws.com/wp-content/uploads/2017/01/OPCW-JIM-Fact-Sheet.pdf>.

³² The JIM found that the Syrian Armed Forces used toxic chemicals in four separate incidents, at Talmenes in 2014, at Sarmin in 2015, at Qmenas in 2015, and Khan Sheikhoun in 2017. It also attributed two instances of the use of mustard gas in 2015 to IS. The Syrian regime’s use at Talmenes in 2014 is included in our Hama Plains case study. See “Third OPCW-UN JIM Report,” “Fourth Report of the Organization for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism,” October 21, 2016, UNSC S/2016/888, http://www.un.org/en/ga/search/view_doc.asp?symbol=S/2016/888; and “Seventh Report of the Organization for the Prohibition of Chemical Weapons-United Nations Joint Investigative Mechanism,” October 26, 2017, UNSC S/2017/904, <http://undocs.org/S/2017/904>. The attribution process has been criticized by the Syrian government and its allies, most notably Russia. However, we have found no credible evidence that any of the Syrian opposition groups have access to sarin, nor do these groups have access to the airpower that was used to deliver the chlorine barrel bombs in the Hama Plains in 2014. For Russian criticism see “Russia’s position on OPCW-UN JIM Report on Syria,” *RT*, October 5, 2016, <https://www.rt.com/op-edge/361650-chemical-weapons-syria-assad/> and Rick Gladstone, “In U.N. Showdown, Russian Veto Kills Syria Chemical Arms Panel,” *New York Times*, November 16, 2017, <https://www.nytimes.com/2017/11/16/world/middleeast/syria-chemical-weapons-united-nations.html>.

contain “markers” that match samples taken from the Syrian government chemical weapons stockpile before its destruction.³³

Our analysis relies on official documentation from these international bodies, such as reports from the UN Secretary-General’s Mechanism, OPCW FFM and JIM. Wherever possible, supplementary material was obtained from other open source information such as that provided by international and local NGOs, media reports (western, regime and rebel affiliated) and secondary analyses in Arabic and English.³⁴

TACTICAL UTILITY

In this section we examine the possible tactical utility of CW, first at Ghouta and then on the Hama Plains. The following section examines the possible utility of CW as a tool of civilian victimization in these cases. As discussed above, military utility is widely accepted as an explanation of weapons proliferation and use, so a finding that CW has been useful in military operations in Syria would lend credence to the fear that the Syrian example will spur further proliferation and use. In the following analysis, however, we find scant evidence of tactical utility, and argue therefore that this provides little incentive for other actors to pursue and use CW.³⁵ In assessing the tactical effects of chemical weapons in our cases we focus on three key questions: Did the use of chemical weapons help the Syrian regime to regain control of contested areas? Did the attacks degrade, hinder or block the rebels’ ability to maintain operations and/or advance? Was there a strong international reaction that may have discouraged follow-up actions by the Assad regime?

³³ Anthony Deutsch, “Exclusive: Tests Link Syrian Government Stockpile to Largest Sarin Attacks--Sources,” *Reuters*, January 30, 2018, <https://uk.reuters.com/article/uk-syria-crisis-chemicalweapons-exclusiv/exclusive-tests-link-syrian-government-stockpile-to-largest-sarin-attack-sources-idUKKBN1FJ0NS>.

³⁴ We use the common English spelling for widely used Arabic names. For other Arabic words, we transliterate using the English alphabet.

³⁵ States may have other reasons for the possession and/or use of CW, including their possible use as a deterrent.

Ghouta

Chemical weapons, and in particular, sarin filled rockets, were used at Ghouta (known administratively as Rif Dimashq) on August 21, 2013, as part of the escalating conflict in Syria. Reports of possible chemical weapons use, made vivid by graphic photos and videos, appeared a few hours after the attacks in media around the world. The international reaction was immediate: the UN Security Council held an emergency session on the day of the attack, and representatives of at least 35 countries urged that the UN investigative team in Syria be allowed “urgent access” to the site.³⁶ The European Union “called for a ‘thorough and immediate’ investigation.”³⁷ Estimates of the fatalities and injuries varied from one source to the other, with a preliminary US assessment stating the attacks resulted in 1,429 deaths.³⁸ In the context of the Syrian war the casualty count was unusually high for a single military operation.

Ghouta’s part in the conflict began with small demonstrations in March 2011, with the size of the demonstrations increasing in response to the first nationwide call for demonstrations on March 25.³⁹ While the Syrian regime was able to maintain a secure grip on the seat of government in Damascus, its hold on Ghouta and the outer suburbs of Damascus was much weaker. That same year armed opposition groups started to form under the

³⁶ Hubbard and Daad, “Images of Death.”

³⁷ Siddiquem, “Syrian Crisis.”

³⁸ See “U.S. Government Assessment of the Syrian Government’s Use of Chemical Weapons on August 21, 2013,” <https://obamawhitehouse.archives.gov/the-press-office/2013/08/30/government-assessment-syrian-government-s-use-chemical-weapons-august-21>. See also Saleh, “Alghouta Alsharqia Kabl W Ba’d Mathbaha Alkimaway” [Eastern Ghouta Before and after the Chemical Massacre], November 27, 2015, <http://aljumhuriya.net/34117>; Médecins Sans Frontières, “Syria: Thousands Suffering from Neurotoxic Symptoms Treated in Hospitals Supported by MSF,” August 24, 2013, <http://www.msf.org/en/article/syria-thousands-suffering-neurotoxic-symptoms-treated-hospitals-supported-msf>; Human Rights Watch, “Attacks on Ghouta: Analysis of Alleged Use of Chemical Weapons in Syria,” September 10, 2013, <https://www.hrw.org/report/2013/09/10/attacks-ghouta/analysis-alleged-use-chemical-weapons-syria>; and “Report of the United Nations Mission to Investigate Allegations of the Use of Chemical Weapons in the Syrian Arab Republic on the Alleged Use of Chemical Weapons in the Ghouta Area of Damascus on 21 August 2013.”

³⁹ Laith al-Khatib, “Syria’s Eastern Ghouta: A Chaotic Conflict of Brigades,” *Al-Akhbar English*, December 20, 2013, <https://english.al-akhbar.com/node/17975>.

symbolic umbrella of the Syrian Free Army, and according to the Lebanese newspaper *Al-Akhbar*, the first armed brigade in Ghouta was created in September 2011.⁴⁰ Some of the armed groups worked to protect the protesters while others carried out hit and run operations on government bases and security forces.⁴¹ During much of 2012, Ghouta was a contested area where neither the regime nor the rebels established full control. By the winter, the rebels had dislodged government troops from significant parts of Ghouta, particularly in the East, and they started to control and govern populated areas that they called “liberated areas.”⁴²

The Assad regime launched an attrition campaign of daily artillery and aerial bombing against areas under rebel control. Government forces also started to choke off supplies to Ghouta, which had no electricity or reliable communication with the outside world.⁴³ By the end of 2012, pro-Assad forces imposed a siege on the area and started to systematically destroy tunnels used by the rebels to bring in supplies. This general situation remained the same up to and after the chemical strikes in August 2013.

The chemical strikes did not translate into significant tactical military advantage either offensively (allowing the regime to regain control) or defensively (preventing a rebel advance). First, chemical weapons did not significantly aid regime advances or their efforts to regain control of these areas. The chemical attacks can be considered the first phase of “Operation Capital Shield” by regime forces. According to Valerie Szybala, this was the “largest-ever Damascus offensive, aimed at decisively ending the deadlock in key contested

⁴⁰ al-Khatib, “Syria’s Eastern Ghouta.”

⁴¹ Ibid. and “Rif Dimashq yaltaheb fi waqh alnizam” [Rif Dimashq Explodes in the Face of the Regime], *Alsharq Alawsat edition*, February 1, 2012, <http://archive.aawsat.com/>.

⁴² Iliana Angelova, “Governance in Rebel-Held East Ghouta in the Damascus Province, Syria,” CGHT Working Paper #10 (Cambridge: Centre of Governance and Human Rights, University of Cambridge, October 2014), <https://www.repository.cam.ac.uk/handle/1810/246194>.

⁴³ See Aos Almubarak, “Ma Lam Yokal 'an Hisar Alghouta” [What Is Not Said on the Ghouta Siege], *Aljumhuriya*, October 17, 2014, <https://www.aljumhuriya.net/ar/31886> and Razan Zaytouna, “Nedaa 'agel Linkadh Alghouta Alsharquia” [Urgent Call to Save Eastern Ghouta], *An-nahar*, September 3, 2013, <https://www.annahar.com>.

terrain around the city.”⁴⁴ In an interview posted on YouTube, a Syrian military commander, Colonel Ali Alsafi, explains that the operation was designed to proceed along two axes in Ghouta, using artillery and ground forces to flush the rebels out of areas they control around the Syrian capital.⁴⁵ The neighborhoods hit by chemical munitions were either under rebel control or contested areas and served as a support base for rebel operations targeting the outskirts of regime-controlled Damascus. Immediately following the chemical attacks, the area saw heavy bombardments with conventional rockets and artillery, suggesting a coordinated government offensive.⁴⁶

Fighting between rebels and pro-Assad forces did occur in the following days, and focused on key areas like the Damascus neighborhoods Jobar (East) and Modhamya (West), which emerged as key hotspots. Yet fighting in these areas following the chemical attacks did not lead to decisive results and the areas remained contested by rebel and government forces. The Carter Center’s analysis of the front line in Damascus makes no mention of any significant changes in August, and notes that in September the “front lines of fighting remained relatively unchanged.”⁴⁷ The Institute for the Study of War refers to limited gains by government forces in Jobar but notes that “their ultimate success is questionable” with buildings and territories only briefly changing hands in a constant state of flux.⁴⁸ The situation in Moadhamya was similar, with no side able to maintain control. This led analysts

⁴⁴ Valerie Szybala, *Assad Strikes Damascus: The Battle for Syria’s Capital*, Middle East Security Report 12 (Washington: Institute of War, January 2017), 24, http://www.understandingwar.org/sites/default/files/ISWAssadStrikesDamascus_26JAN.pdf.

⁴⁵ Newsnation6, “Syria [sic] Army Foil Terrorist Plot to Invade Damascus,” (Video), posted September 8, 2013, <https://www.youtube.com/watch?v=ByVn7ZShzqI>.

⁴⁶ US White House, “Government Assessment of the Syrian Government Use of Chemical Weapons on August 21, 2013,” <https://obamawhitehouse.archives.gov/the-press-office/2013/08/30/government-assessment-syrian-government-s-use-chemical-weapons-august-21> and French Government, “Syrian Chemical Programme,” September 3, 2013, http://www.diplomatie.gouv.fr/IMG/pdf/Syrian_Chemical_Programme.pdf.

⁴⁷ The Carter Center, “Syria: Countrywide Conflict Report #2,” (Atlanta: The Carter Center, November 2013), 14-17, https://www.cartercenter.org/resources/pdfs/peace/conflict_resolution/syria-conflict/nationwideupdate_nov-20-2013.pdf. See also the executive summary’s reference to “ossification.”

⁴⁸ Szybala, *Assad Strikes Damascus*, 28.

like Szybala to conclude that “the long standing siege seems to be a much more effective tactic.”⁴⁹

Second, there is no evidence to suggest that the chemical attacks stalled an alleged rebel offensive on the capital. As described by Charles Lister, “the tide began flowing in the Assad regime’s favor” in mid-2013 with the opposition not being able to “decisively ‘win’ the conflict.”⁵⁰ Despite rumors of a rebel ‘zero hour’ offensive on the capital, it was clear, even before the chemical attack, that rebels had already lost momentum.⁵¹ Examination of media reports and available testimonies suggest that rebel plans to advance to the capital had stalled by the end of 2012.⁵² Instead, rebels in control of areas surrounding Damascus started to look inwards, seeking to consolidate the gains they had already achieved rather than attack regime forces head-on. In a review of the state of rebel advances around Damascus, a Free Syrian Army spokesperson lamented that these were “almost non-existent” during 2013.⁵³ The result in Ghouta was a military stalemate that was described by a Carter Center report as an “ossification” that applied along most of Syria’s front lines.⁵⁴

It is not possible to completely discount the counterfactual possibility that the rebels would have been in a stronger position in the absence of the CW attacks. It is also possible that the use of CW enhanced the regime’s position by siphoning-off rebel attention and

⁴⁹ Ibid.

⁵⁰ Lister, *The Syrian Jihad*, 5-6.

⁵¹ According to Yassin Haj Saleh, the most likely time for a rebel offensive on the capital was “late 2012 and early 2013.” See Yassin Alhaj Saleh, “Althawra, Alsafafya Alimbrialia: thalatha atwar fi Khamas Sanawat” [Revolution, Salafism and Imperialism: Three patterns in Five Years], *Aljumhuriya*, December 30, 2015, <http://aljumhuriya.net/34256>. Yassin, a prominent Syrian commentator who lived in the area, argues that with the stalemate, many of brigades started to focus on making profit from the areas they controlled instead of bringing down the Assad regime. See Yassin Alhaj Saleh, “Abu Adnan Flytany” [Abu Adnan Flytany], *Aljumhuriya*, May 16, 2014, <http://aljumhuriya.net/28192>.

⁵² Caroline Akoum describes this halt as a “tactical retreat,” and mentions battle fatigue and low ammunition as contributing factors. Caroline Akoum, “Tarag ‘amalyat Algiesh Alhor” [Retreat of the Free Army], *Alsharq Alawsat*, January 28, 2013, <http://archive.aawsat.com/>.

⁵³ Mosaab Abou Katada, “Algaysh Alhor: Tarago’ saytaret almo’arda ala alrdh” [Free Army: Opposition’s Control of the Ground Declines in 2013], *Anbaa*, December 27, 2013, <http://anbaaonline.com/?p=183952>.

⁵⁴ The Carter Center, “Syria Countrywide Conflict Report # 2,” (Atlanta: The Carter Center, November 2013), 4, https://www.cartercenter.org/resources/pdfs/peace/conflict_resolution/syria-conflict/nationwideupdate_nov-20-2013.pdf.

resources towards the areas hit. A lack of available evidence makes assessment of this challenging. However, the fact that regime forces were not able to make any decisive advances or take back control of these strategic areas from the rebels leads us to conclude that the overall impact of the CW attacks on the military situation on the ground was limited.

The international reaction to the attacks in Ghouta may have contributed to the inability of the regime to gain from the use of CW. While we have no direct evidence of the Assad regime's decision making, it is logical to conclude that the widespread international condemnation and the discussion of the use of force in response to the chemical attacks discouraged further use of CW at this time.⁵⁵ Any further use of chemical weapons in these areas would have exacerbated the international crisis and bolstered the case for international intervention, especially since the UN inspectors in Syria had been asked to investigate the August 21 attacks. In addition, the threat of foreign military intervention meant that Assad now had to prepare to fight on more than one front. US military assets in the region were increased pending a political decision to strike.⁵⁶ This forced the regime to make precautionary arrangements to protect its forces. This resulted in a redistribution of forces that could have further reduced the ability of government forces to execute effective ground

⁵⁵ For example, "Syria: Cameron and Obama Threaten 'Serious Response'," *BBC News*, August 25, 2013, <http://www.bbc.co.uk/news/uk-23830590>; Frederik Pleitgen and Tom Cohen, "'War-weary' Obama says Syria Chemical Attack Requires Response," *CNN*, August 30, 2013, <http://edition.cnn.com/2013/08/30/world/europe/syria-civil-war/index.html>; Julian Borger, "France Warns Syria of Forceful Response over Chemical Weapons Claims," *The Guardian*, August 22, 2013, <https://www.theguardian.com/world/2013/aug/22/france-warns-syria-response-chemical>.

⁵⁶ Andrea Shalal-Esa, "Sixth US Ship Now in Eastern Mediterranean 'as Precaution'," *Reuters*, <https://www.reuters.com/article/us-syria-crisis-ships/sixth-u-s-ship-now-in-eastern-mediterranean-as-precaution-idUSBRE97U01Z20130831>; Tim Ross and Ben Farmer, "Navy Ready to Launch First Strike on Syria," *The Telegraph*, August 25, 2013, <http://www.telegraph.co.uk/news/worldnews/middleeast/syria/10265765/Navy-ready-to-launch-first-strike-on-Syria.html>; Thom Shanker, C.J. Chivers and Michael R. Gordon, "Obama Weighs 'Limited' Strikes Against Syrian Forces," *New York Times*, August 27, 2013, <http://www.nytimes.com/2013/08/28/world/middleeast/obama-syria-strike.html>; Julie Peace, "After UK Opts Out, US Readies Solo Action Against Syria," *The Times of Israel*, August 30, 2013, <http://www.timesofisrael.com/after-uk-opts-out-us-readies-solo-action-against-syria/>; "France's Hollande Backs US on Syria Action," *BBC News*, August 30, 2013, <http://www.bbc.co.uk/news/world-middle-east-23897775>; Robert Beckhusen, "U.S. Readies More Warships and Aircraft for Syria Strike," *Officiere.ch* (blog), September 2, 2013, <https://www.offiziere.ch/?p=13367>.

campaigns in Ghouta.⁵⁷ Together, the strong international condemnation, the risk of a punitive air strike, and the regime's own public denial of chemical use likely curtailed the ability of the Syrian armed forces to take military advantage of the mayhem caused by the attacks.

In addition to its impact on the immediate military situation, the threat of the use of force also led to Syria's membership in the CWC and the destruction of its declared stockpile of chemical weapons.⁵⁸ While the momentum behind a military strike on Syria slowed at the end of August, with a vote by the British parliament against participation and a decision by President Obama to seek Congressional approval, on September 9th US Secretary of State Kerry suggested in an off-hand remark that Syria could avoid the use of force through chemical disarmament.⁵⁹ That same day, Russia proposed that Syria chemically disarm and join the Chemical Weapons Convention, Syria announced its willingness to do so on September 10th, and the US and Russia agreed the "Framework for Elimination of Syrian Chemical Weapons" on September 14th.⁶⁰ Syria submitted the first declaration of its chemical stockpile to the OPCW on September 20th, and in June 2014 the last of Syria's

⁵⁷ Christopher Kozak, "Reconfiguration of Regime's Military Assets, Kfar Souseh Neighborhood, Damascus," *Institute for the Study of War Syria Updates* (blog), September 2, 2013, <https://iswsyria.blogspot.com/2013/09/reconfiguration-of-regimes-military.htm>; Adam Entous, Julian E. Barnes and Nour Malas, "Elite Syrian Unit Scatters Chemical Arms Stockpile," *Wall Street Journal*, September 12, 2013, <https://www.wsj.com/articles/elite-syrian-unit-scatters-chemical-arms-stockpile-1379036397>.

⁵⁸ The Assad regime's declared stockpile included 1308 metric tons of chemical weapons; specific agents mentioned include sarin, mustard and VX. Full details of Syria's declaration and the OPCW's findings have not been released. See Carla E. Humud, Christopher M. Blanchard and Mary Beth D. Nikitin, "Armed Conflict in Syria: Overview and US Response," (Washington D.C.: Congressional Research Service, October 13, 2017), 37, <https://fas.org/sgp/crs/mideast/RL33487.pdf>. Note that while the use of chlorine as a weapon is banned by the Chemical Weapons Convention, it is not listed on any of the CWC's schedules and as such Syria was not obligated to declare or destroy any chlorine it possessed.

⁵⁹ Arshad Mohammed and Andres Osborn, "Kerry: Syrian Surrender of Chemical Arms Could Stop US Attack," *Reuters*, September 9, 2013, <https://www.reuters.com/article/us-syria-crisis-kerry/kerry-syrian-surrender-of-chemical-arms-could-stop-u-s-attack-idUSBRE9880BV20130909>.

⁶⁰ See the "Joint National Paper by the Russian Federation and the United States of America, Framework for the Elimination of Syrian Chemical Weapons;" Julian Borger, Dan Roberts, and Spencer Ackerman, "Syria Pledges to Sign Chemical Weapons Treaty and Reveal Scale of Stockpile," *The Guardian*, September 10, 2017, <https://www.theguardian.com/world/2013/sep/10/russia-un-syrian-chemical-weapons>.

declared stockpile was removed from Syria.⁶¹ While as subsequent events make clear this did not completely eliminate Syria's ability to use chemical weapons, the destruction of Syria's declared stockpiles and CW facilities did limit and complicate that ability.

Overall, we find that the chemical weapons attacks on the Damascus suburbs had limited tactical utility. Despite the local impact of the attacks in terms of casualties, the use of chemical weapons did not translate into a meaningful military advantage or a significant change in the balance of power on the ground. At best, the use of CW at Ghouta provided a limited advantage to the Assad regime, one that was likely outweighed by the international reaction, which included an increased threat of military intervention and ultimately led to the destruction of Syria's declared chemical weapons stockpile.

The Hama Plains

During the summer of 2014 chlorine was used “systematically and repeatedly” in attacks on the North Hama Plains (in both Hama and Idlib Provinces).⁶² Twenty-one incidents were investigated by the FFM and are the topic of the Second and Third Fact Finding Mission Reports (see Table One).⁶³ Total reported casualties range from 350-500, with 13 deaths.⁶⁴

⁶¹ Anthony Deutsch, “Syria Hands Over Remaining Chemical Weapons for Destruction,” *Reuters*, June 23, 2014, <https://www.reuters.com/article/us-syria-crisis-chemicalweapons/syria-hands-over-remaining-chemical-weapons-for-destruction-idUSKBN0EY18T20140623>.

⁶² “Second Report of the OPCW Fact-Finding Mission in Syria,” September 10, 2014, UNSC S/1212/2014, 8, https://www.opcw.org/fileadmin/OPCW/Fact_Finding_Mission/s-1212-2014_e_.pdf. At this point in the war, all the allegations concern chlorine.

⁶³ “Second OPCW FFM Report” and “Third OPCW FFM Report.” As mentioned above, the JIM found that the Assad regime used chlorine on April 21 in Talmenes, a rebel controlled village 30 km to the north of Morek and Kafr Zita. Thus far, this is the only case attributed by the JIM to the Syrian regime in 2014. Talmenes is proximate to Maarrat al-Nu'man, which like Khan Sheikhoun, was host to besieged government garrisons along the M5. Al-Tamanah, a village close to Khan Sheikhoun also allegedly suffered chlorine attacks on three occasions in April.

⁶⁴ “Third OPCW FFM Report,” 11, 17 and Table 6, 24; the figure on casualties are from page 4. Note that at least one of these appears to have been the result of head injuries caused by the physical impact of the canisters, rather than the gas itself. *Ibid.*, 26. Note also that these figures are lower than would be expected for conventional munitions. See DeGhett, “The Build-It-Yourself Bombs.”

[Insert Table 1 here]

As in the case of Ghouta, our analysis of the effects of chemical weapons on the Hama Plains in the summer of 2014 finds little tactical utility. Given the targeting of the attacks on villages on or near the front lines, the focus of our analysis is on whether the use of chemical weapons broke the morale of opposition fighters or otherwise allowed advances by government forces while inhibiting the opposition. We find no evidence that they did so.⁶⁵

In some sense, the limited tactical utility of these attacks is to be expected given the way in which they were carried out. First, the chemical agent used was chlorine, which has much lower lethality than sarin.⁶⁶ Second, each attack was limited in scale, usually involving one or two chlorine barrel bombs.⁶⁷ Furthermore, the distinct whistling, thudding and dispersal mechanism noise provided warning of a chemical attack.⁶⁸ While the use of chlorine at night could have amplified its effects, given that many potential victims would have been resting in basements underground where the gas would have settled, there appears to have been no attempt to use conventional bombardment to keep people from evacuating.⁶⁹ Despite the limited scale of the attacks, it is still important to examine what effects, if any, they had on the ground in order to see if this case suggests military utility that might prompt other

⁶⁵ The data available does not allow for judgments of more subtle effects, for example, whether the use of chemical weapons in these cases allowed government forces to hold on in these areas despite the need to move some government forces to other areas.

⁶⁶ See footnote 7.

⁶⁷ The reason for the limited scale of the attacks is not clear, as evidence on regime intentions and decision making is not available. Possibilities include the need to use helicopters for other purposes (including transport and conventional bombardment), the desire to avoid international uproar such as that which followed the Ghouta attack, or that the attacks were intended as a weapon of civilian victimization, with a focus on causing fear rather than mass casualties. On the availability of helicopters, see Karl Dewey, "Is the Use of Chemical Weapons in Syria Challenging the Non-proliferation Regime?" (MA Thesis, King's College London, 2016), 17; see also "SyAAF Helicopter Sorties from Misc. AFB's (1st Quarter 2014)," *Luftwaffe A.S.* (blog), April 24, 2014 at <https://luftwaffeas.blogspot.co.uk/2014/04/syaaf-helicopter-sorties-from-misc-afbs.html>. We thank one of our anonymous reviewers for sharing the latter source.

⁶⁸ "Third OPCW FFM Report," 18.

⁶⁹ Of the alleged incidents in the Third FFM report, two were in the day, one was at 7:00pm, and the remaining 17 were at night. This report suggests that many casualties could have been avoided if the residents had evacuated the affected area earlier. See "Third OPCW FFM Report," 28.

actors to develop and use these weapons. In our analysis, we first explain the general context of the alleged chemical attacks, argue that there was in fact little tactical utility, and then examine the international reaction.

There has been an ongoing battle for control of the Hama Plains and the M-5 highway that runs through it since the outset of the war. This has involved direct fighting, frequent artillery, air and rocket attacks, and “sustained attacks” on civilians, including reports of deliberately burned crops and siege-like tactics.⁷⁰ The M5 highway connects the majority of the country’s population, including those in Damascus, Homs, Hama and Aleppo. Key towns in the Hama Plains include Khan Sheikhoun and Morek, which are both bisected by the M5 highway. Villages proximate to the road, such as Kafr Zita, Al Tamanah, and Talmenes, were strategically important as basing points for rebel offensives. If the rebels controlled sections of the M5 highway, they would split the Assad regime’s territory, forestalling attacks into Aleppo and isolate the government garrisons in Idlib province.

After failed offensives in 2012 and 2013, the rebels made advances on the Hama Plains in the spring and summer of 2014.⁷¹ For example, the Government lost control of Morek in February 2014, and by April 2014 the government’s position on the Hama Plains was becoming increasingly desperate.⁷² On April 3, a broad coalition of rebel forces launched

⁷⁰ The OPCW reports the bombardment of Kafr Zita began in late 2011 and by the time of the alleged chemical attacks of 2014, it “had suffered hundreds of conventional attacks since the start of the current conflict.” See “Third OPCW FFM Report,” 22. For reports of the attacks on civilians, see “Report of the Independent International Commission of Inquiry on the Syrian Arab Republic,” August 16, 2013, UNSC A/HRC/24/46, 16 and 22, <http://undocs.org/A/HRC/24/46> and “Third OPCW-UN JIM Report,” 25-26. The area also hosts the Hama Military Base, which serves as a source for regime air power.

⁷¹ Jonathan Dupree, “Syria Update: Regime Breaks Siege of Wadi al Deif,” *Institute for the Study of War Syria Updates* (blog), April 18, 2013, <http://www.understandingwar.org/backgrounder/syria-update-regime-breaks-siege-wadi-al-deif> and Australian Associated Press, “Syria Regime Bombards Rebels,” *The Australian*, November 14, 2012, <http://www.theaustralian.com.au/news/latest-news/syria-rages-coalition-calls-for-arms-news-story/bba6e4cfd2bf804d25b582efc5dcdeb2>.

⁷² See The Carter Center, “Syria: Countrywide Conflict Report #4,” (Atlanta: The Carter Center, September, 2014), 39-40, https://www.cartercenter.org/resources/pdfs/peace/conflict_resolution/syria-conflict/nationwideupdate-sept-18-2014.pdf. Morek is notable for being a predominantly Alawite town, the same religious sect as President Assad. As a result, local militias provided support to the government forces fighting there. See Mariam Karouny and Erika Solomon, “Syrian Rebels Fight for Strategic Town in Hama Province,” *Reuters*, December 20, 2012, <https://www.reuters.com/article/syria-crisis-idINDEE8BJ08N20121220>: This is not to suggest that the fighting was strictly along sectarian lines as members

an offensive against regime checkpoints that were still holding out along the M5, and the rebels made steady progress throughout the month. The rebels were also gaining ground around Khan Sheikhoun, which they captured in late May and used to support a “north-south push along the M-5.”⁷³ While the government regained control of Homs earlier that month, the Carter Center makes it clear that this did not end the rebel momentum: “Throughout the month of July and August, opposition forces continued to put pressure on Maarrat al-Numan and the military bases surrounding it.”⁷⁴

This is the broad context in which the chlorine attacks on the Hama Plains took place.

CW usage occurred seemingly in response to specific regime vulnerabilities in an apparent

of the “Shabbiha pro-Assad militias...[included] Sunnis.” Some displaced people from Morek ended up in Kafr Zita - e.g. Violations Documentation Center in Syria, “Mustafa Ahmad al-Mohammad,” <http://www.vdc-sy.info/index.php/en/details/martyrs/118175>, accessed February 14, 2018. Morek had been a government stronghold for much of the war; the rebels had tried to contest the town but had been repelled in late 2012. The fighting for Morek in 2014 was prolonged and intense. On February 1, opposition forces were quickly able to secure vital checkpoints around the town. They were then able to repulse a government counter-attack two days later, reportedly inflicting 20 casualties. Given the strategic importance of the town, the area was quickly reinforced with Islamic Front fighters from Kafr Zita. See “Video: Islamic Front sends reinforcements to Morek in Hama, Syria,” *Belfast Telegraph*, February 4, 2014, <http://www.belfasttelegraph.co.uk/video-news/video-islamic-front-sends-reinforcements-to-morek-in-hama-syria-29979318.html>, and “Violent Clashes and Losses in Regime Side in Hama,” *Syrian Observatory for Human Rights*, February 3, 2014, <http://www.syriahr.com/en/?p=4082>. There was heavy fighting on the outskirts of Morek for the remainder of February as the rebels continued to repulse repeated regime counterattacks. “Violent Clashes in Hama and Aleppo,” *Syrian Observatory for Human Rights*, February 23, 2014, <http://www.syriahr.com/en/?p=4251>. Persistent skirmishes on the southern outskirts of Morek would continue for the next several months. See “Violent Clashes Continue Around Morek Town,” *Syrian Observatory for Human Rights*, March 17, 2014, <http://www.syriahr.com/en/?p=4376> and Scott Lucas, “Syria Daily, April 20: The Insurgents Strike — Even in Homs,” *EA worldview*, April 20, 2014, <http://eaworldview.com/2014/04/syria-daily-insurgents-strike-even-homs/>.

⁷³ See Carter Center, “Report #4,” 39-40. Khan Sheikhoun was captured by government forces in the summer of 2012, and they repelled an abortive FSA offensive in mid-2013. By February 2014, the situation had become confused with the government fighting against FSA elements for the center of the city while the regime also held 21 fortified checkpoints around the outskirts of the city, simultaneously placing it under siege. As part of a spring offensive, the rebels had captured 10 of these 21 checkpoints by mid-March, despite the heavy use of government airpower. See Reuters, “Syria Crisis: Khan Sheikhoun Under Army Control; Violence in Damascus,” *Huffington Post*, September 5, 2012, http://www.huffingtonpost.com/2012/07/06/syria-crisis-khan-sheikhoun_n_1653641.html; Isabel Nassief, “The Campaign for Homs and Aleppo,” *Middle East Security Report* 17 (Washington: Institute for the Study of War) January 2014, 20-21, <http://www.understandingwar.org/sites/default/files/Nassief-BattleforHomsAleppo-web.pdf>; Osama Abu Zeid and Elizabeth Parker-Magyar, “Rebels, Regime Vying for Valuable Prize in North M-5 Highway,” *Syria Direct*, March 12, 2014, <http://syriadirect.org/news/rebels-regime-vying-for-valuable-prize-in-north-m-5-highway/>; “Air Raids Kill 5 in Idleb Countryside as Regime and Opposition Fight for Control,” *NOW media*, February 21, 2014, <https://now.mmedia.me/lb/en/nowsyrialatestnews/536373-air-raids-kill-5-in-idleb-countryside-as-regime-and-opposition-fight-for-control>; and Scott Lucas, “Syria: The Battle Around Khan Shaykhoun,” *EA worldview*, March 13, 2014, <http://eaworldview.com/2014/03/syria-battle-around-khan-shaykhoun/>.

⁷⁴ Carter Center, “Report #4,” 40.

effort to counter rebel operations. However, the use of chlorine had little impact. After the chlorine attacks from April-August 2014, the frontlines to the south of Kafr Zita were broadly similar to what they were in February 2014 and the rebels had gained full control of Khan Sheikhoun.

For example, the use of chlorine at Kafr Zita in April 2014 has been seen as part of the government's efforts to retake Morek and a sign of its growing desperation.⁷⁵ The Violation Documentation Center quotes a "dissident colonel" who states that the "use of the chemical weapons on the part of the regime...[was] an endeavor to compensate for the operation [at Morek]."⁷⁶ A local activist operating out of Turkey stated that "the [CW] air raids on the rebel-held village came as nearby areas including Morek and Khan Sheikhoun have witnessed intense clashes between troops and opposition fighters."⁷⁷ The use of chlorine here has also been seen as an effort to amplify the government's airpower advantage for tactical gain.⁷⁸ However, the rebels maintained control of Morek and Kafr Zita during the months of April and May and continued their offensive on Khan Sheikhoun.

⁷⁵ The regime had been making heavy use of air power and had introduced other new weapons systems to the area, emphasizing its strategic importance. See Human Rights Watch, "Syria: New Deadly Cluster Munition Attacks," February 18, 2014, <https://www.hrw.org/news/2014/02/18/syria-new-deadly-cluster-munition-attacks>; Scott Lucas, "Syria: The Battle Around Khan Shaykhoun," *EA worldview*, March 13, 2014, <http://eaworldview.com/2014/03/syria-battle-around-khan-shaykhoun/>; Zeid and Parker-Magyar, "Rebels Vying for M-5 Highway."

⁷⁶ Violations Documentation Center in Syria, "Allegations of the Use of Internationally Prohibited Gases in Kafer Zeta – Hama Province," April 14, 2014, <http://www.vdc-sy.info/index.php/en/reports/1397487934>.

⁷⁷ Note that news reports linked the fall of Morek to the use of chlorine on Kafr Zita in April 2014. See Bassem Mroue, "Syrian Villagers Injured in Poison Gas Attack," *Business Insider*, April 12, 2014, <http://www.businessinsider.com/syrian-villagers-injured-in-poison-gas-attack-2014-4>; Saad Abedine, "Syrian Government, Rebels Say Other Side Used Poison Gas," *CNN*, April 14, 2014, <http://edition.cnn.com/2014/04/12/world/meast/syria-civil-war/> and Sam Dagher, "Opposition Accuses Syrian Regime of Attacks With Lethal Chlorine Gas," *Wall Street Journal*, April 13, 2014, <https://www.wsj.com/articles/opposition-accuses-syrian-regime-of-attacks-with-lethal-chlorine-gas-1397417137>.

⁷⁸ Kozak states that "in order to maintain its defenses along the...Hama-Idlib provincial border, the regime relied heavily upon a high rate of airstrikes and chlorine gas attacks, particularly against...Kafr Zita [in 2014]." Kozak, "An Army in All Corners," 21.

Indeed, the May CW attacks at both Kafr Zita and at Al-Tamanah have been described as pre-emptive strikes to forestall the final rebel offensive on Khan Sheikhoun.⁷⁹ If this was the strategy, it failed.⁸⁰ On May 25, rebel forces launched an attack against the only remaining government checkpoint around Khan Sheikhoun (Khazanat Military Base). With the use of suicide bombers, the rebels overran the base and effectively ended the battle for the town.⁸¹

While territory changed hands, there is no apparent link between the transfer of control and CW use.⁸² For example, the rebels maintained control of Morek until October 24, 2014.⁸³ While government forces had advanced to the outskirts of Morek by mid-September, CW had little to do with this. The latest attacks covered by the Third Mission of the OPCW are those of August 28 and 30, and the Syrian American Medical Society reports only one attack in September on the Hama Plains.⁸⁴ The fighting continued after the fall of Morek, with regime forces pushing north on the M5 towards Khan Sheikhoun, returning to the Khazanat Military Base by November 2014 and potentially threatening Kafr Zita.⁸⁵ However, the fall of the regime garrisons at Wadi ad-Daif and al-Hamidiyah on December 14, 2014 allowed the opposition to refocus their efforts further south, “prompting a rout which

⁷⁹ “Third OPCW FFM Report,” 24.

⁸⁰ Ibid., 22.

⁸¹ Syria Direct, “Syria Direct: News Update 5-26-2014,” May 26, 2014, <http://syriadirect.org/news/syria-direct-news-update-5-26-2014> and “Third OPCW FFM Report,” 22.

⁸² The Syrian government regained control of Morek in October after the government deployed its elite Tiger Forces. Leith Fadel, “Tiger Forces Commander Enters Morek; SAA Continues Offensive in Southern Aleppo,” *Almasdar News*, October 26, 2014, <https://www.almasdarnews.com/article/tiger-forces-commander-enters-morek-saa-continues-offensive-southern-aleppo>.

⁸³ Reuters, “Syrian Army Recaptures Town in Western Syria - State TV,” October 24, 2014, <http://uk.reuters.com/article/uk-syria-crisis-military-idUKKCN0ID1DL20141024>; Alalam, “Syrian Army Regained Control of Morek,” October 24, 2014, <http://en.alalam.ir/news/1643208>. Opposition forces re-took control of the town 12 and a half months later, in early November 2015; see Naline Malla and Sylvia Westall, “Syrian Rebels Seize Town in West in Blow to Government,” *Reuters*, November 5, 2015, <http://www.reuters.com/article/us-mideast-crisis-syria-idUSKCN0SU0XY20151105>.

⁸⁴ This was at Morek on September 13, 2014, with no casualties. See SAMS, “A New Normal: Ongoing Chemical Weapons Attacks in Syria.”

⁸⁵ Leith Fadel, “Idlib: The Syrian Army Enters Khan Sheikhoun,” *Almasdar News*, November 26, 2014, <https://www.almasdarnews.com/article/idlib-syrian-army-enters-khan-sheikhoun/>.

removed all remaining regime presence along the M5 Highway north of Morek.”⁸⁶ Thus by mid-December the frontlines on the Hama Plains were roughly what they been in February 2014, before the first alleged use of chlorine.⁸⁷

We cannot rule out the possibility that the use of chemical weapons had some minor immediate utility—that it served to divert some rebel resources and/or had some minor morale effects. But the analysis shows that the use of chemical weapons did not lead to immediate changes in the control of territory or contribute to a lasting regime victory in the areas where it was used.

The international response to the alleged use of chlorine on the Hama Plains was much more muted than the response to the use of sarin at Ghouta. Despite UNSCR 2118 (September 27, 2013), which called for the imposition of “measures under Chapter VII of the United Nations Charter” in the event of the “use of chemical weapons by anyone in the Syrian Arab Republic,” senior western politicians did not call for a military response.⁸⁸ While some like President Hollande of France played down the significance of the attacks, others such as US Secretary of State Kerry admitted that the Assad regime was in breach of the CWC but searched for ways other than the use of force “to hold Assad to account.”⁸⁹ In the event, the focus of the international response was on confirming whether or not chemical

⁸⁶ BBC News, “Syria Conflict: Rebels Capture Key Idlib Army Bases,” December 15, 2015, <http://www.bbc.co.uk/news/world-middle-east-30476609>; Kozak, “An Army in All Corners,” 32.

⁸⁷ Indeed, in February 2015 the Carter Center reports that “in northern Hama, opposition forces continue to hold off government advances around Morek along the M5 highway. They have also retained control of the cities of Latamneh and Kafr Zita, despite significant government shelling and aerial bombardment. Meanwhile in Latakia, opposition forces target government positions along a 20 km frontline in the northeast corner of the governorate.” The Carter Center, “Syria: Countrywide Conflict Report #5,” (Atlanta: The Carter Center, February 2015), 12, https://www.cartercenter.org/resources/pdfs/peace/conflict_resolution/syria-conflict/nationwideupdate-feb-28-2015.pdf.

⁸⁸ UNSCR 2118 (2013), S/RES/2118, September 27, 2013, [https://undocs.org/S/RES/2118\(2013\)](https://undocs.org/S/RES/2118(2013)).

⁸⁹ Martin Chulov, “France Backs Claims that Syrian Forces Have Used Chemical Weapons Recently,” *The Guardian*, April 20, 2016, <https://www.theguardian.com/world/2014/apr/20/france-syrian-forces-chemical-weapons>; Damien McElroy, “John Kerry Declares Syria Regime has Broken Chemical Weapons Deal,” *Telegraph*, September 18, 2014, <http://www.telegraph.co.uk/news/worldnews/middleeast/syria/11107389/John-Kerry-declares-Syria-regime-has-broken-chemical-weapons-deal.html>.

weapons had been used rather than on attribution.⁹⁰ While the US “publicly embraced limited overt intervention in the conflict in Syria” in 2014, this more active stance by the US was justified by the threat from IS (which had declared itself the caliphate in June 2014), not in reference to the use of chemical weapons.⁹¹

Unlike the case of Ghouta, which prompted threats of the use of force and where we did not see repeated chemical attacks, on the Hama Plains the international response was more subdued and numerous chlorine attacks occurred. In addition to the 21 alleged attacks investigated by the FFM, SAMS reports an additional 20 CW attacks in Syria from the beginning of April, when the FFM was launched, through the end of August; 10 CW attacks from September-December 2014; and a further 69 attacks through October 25, 2015.⁹² However, this repeated use was not enough to make much difference on the ground.

CIVILIAN VICTIMIZATION

As with tactical utility, our examination of chemical weapons as a tool of civilian victimization in Syria uncovers little evidence of utility, and therefore provides little reason for other actors to pursue and use CW. In assessing civilian victimization our focus is on whether it undermined civilian support to the rebels in a militarily significant way. Civilian

⁹⁰ This proved to be a lengthy process. The FFM report covering the attacks on Hama Plains was distributed on December 18, 2014, more than 7 months after the first alleged chlorine incident. See “Third OPCW FFM Report.”

⁹¹ Carla E. Humud, Christopher M. Blanchard, and Mary Beth D. Nikitin, “Armed Conflict in Syria: Overview and U.S. Response,” January 6, 2017, 16, <http://www.dtic.mil/get-tr-doc/pdf?AD=AD1024469>. Colum Lynch suggests that further American condemnation of chlorine use was limited because other policy goals (e.g. the Joint Comprehensive Plan of Action with Iran and a wider peace settlement within Syria) took priority. See Colum Lynch, “To Assuage Russia, Obama Administration Backed Off Syria Chemical Weapons Plan,” *Foreign Policy*, May 19, 2017, <http://foreignpolicy.com/2017/05/19/to-assuage-russia-obama-administration-backed-off-syria-chemical-weapons-plan/>. We thank an anonymous reviewer for bringing this piece to our attention.

⁹² SAMS, “A New Normal,” 52-56. The OPCW’s Fact Finding Mission reports that “following the establishment of the FFM in late April, there was a marked reduction in allegations [of CW attacks], especially in the months of May, June and July. However, during the month of August there was a spate of new allegations.” See “Second OPCW FFM Report,” 8.

victimization has been an overwhelming feature of the Syrian War and chemical weapons are only one among many means used. Estimates of total deaths by the end of 2016 range from 300,000 to 470,000, and the conflict has featured indiscriminate and direct attacks on civilians, sieges and denial of humanitarian access, attacks on schools, markets, medical facilities and workers, enforced disappearances, torture, and unlawful killings.⁹³ Zeid Ra'ad Al Hussein, the UN Commissioner for Human Rights, stated on March 14, 2017 that Syria had become “a place of savage horror and absolute injustice....the worst man-made disaster the world has seen since World War II.”⁹⁴ The UN Office for the Coordination of Humanitarian Affairs (OCHA) reports that “as the Syria crisis enters its seventh year....13.5 million people require humanitarian assistance....[and] over half of the population has been forced from their homes.”⁹⁵

The overwhelming number of threats that civilians have faced in Syria makes it difficult to find evidence of the possible effects of chemical weapons versus the other tools of civilian victimization. Amid the chaos that is Syria, the data that might allow us to draw correlations between the occurrences of the many different atrocities listed above and shifts in civilian morale, loyalties, or the numbers of refugees and internally displaced persons is not available. Interviews with victims about the relative effects of the various threats they faced or face in the light of their on-going hardship are not appropriate. This leaves us with

⁹³ See Amnesty International, “Syria 2016/17,” <https://www.amnesty.org/en/countries/middle-east-and-north-africa/syria/report-syria/>, accessed February 14, 2018; Human Rights Watch, “Syria: Country Summary,” January, 2017, https://www.hrw.org/sites/default/files/syria_1.pdf. See also the documentation and other materials provided by the Independent International Commission of the Inquiry on the Syrian Arab Republic, available at <http://www.ohchr.org/EN/HRBodies/HRC/HRCISyria/Pages/IndependentInternationalCommission.aspx>. The UN Special Envoy for Syria put the number of deaths at around 400,000 in April 2016; see United Nations Radio, “Syria Envoy Claims 400,000 have Died in Conflict,” *UN Media*, April 22, 2016, <https://www.unmultimedia.org/radio/english/2016/04/syria-envoy-claims-400000-have-died-in-syria-conflict/#.WR706OvyvtC>.

⁹⁴ Text of Statement by UN High Commissioner for Human Right Zeid Ra'ad Al Hussein, “Syria Worst Man-Made Disaster since World War II-Zeid,” *UN OHCHR*, March 14, 2017, <http://www.ohchr.org/EN/NewsEvents/Pages/DisplayNews.aspx?NewsID=21373&LangID=E>.

⁹⁵ OCHA, “About the Crisis,” <http://www.unocha.org/country/syrian-arab-republic/syria-country-profile/about-crisis>, accessed February 14, 2008.

the information we have been able to gather about the situation before and after a particular chemical attack, the impressions of humanitarian actors and other observers, as well as the general data that is available on refugee flows.⁹⁶

Ghouta

Civilians made up the majority of those killed in the CW attack at Ghouta. It has been described as a civilian victimization tactic--as a “‘shock and awe’ campaign” with “the potential to deprive local fighters of some of their support base by convincing terrified civilians in contested suburbs that the price of supporting the opposition fighters was too high.”⁹⁷ However, we do not find evidence of a decrease in opposition fighting or a collapse of civilian morale.⁹⁸ Despite reports of chaos and panic in the areas after the attacks, insurgent and regime forces continued to clash throughout the Damascus suburbs.⁹⁹ Rebels continued to hold their positions in the areas surrounding Damascus and managed to repel the government offensive following the attacks.

⁹⁶ Given the fact that some of the areas under CW attack were also under siege, it may seem strange to use refugee flows as an indicator of CW effect: If there was a state of siege, how could people flee? But the regime’s use of siege tactics seems to have varied in intention and means. For example, the withholding of food and other humanitarian supplies can be used to kill or to encourage people to leave and/or surrender so that the regime gains control of that area.

⁹⁷ Szybala, *Assad Strikes Damascus*, 26.

⁹⁸ We have also not found any reports that there were massive numbers of people who tried to flee but were prevented from doing so by the siege. Immediate news reports after the attacks do mention people fleeing the affected areas, but this seems to be to escape the chemical attack. See, for example, “Syria Crisis: Rebels Claim Hundreds Killed in Government Chemical Weapons Attack,” *The Guardian*, August 21, 2013, <https://www.theguardian.com/world/2013/aug/21/syria-crisis-rebels-claim-hundreds-killed-government-chemical-weapons-attack-live>; see also Ben Hubbard, Mark Mazzetti and Mark Landler, “Blasts in the Night, a Smell, and a Flood of Syrian Victims,” *New York Times*, August 26, 2013, <http://www.nytimes.com/2013/08/27/world/middleeast/blasts-in-the-night-a-smell-and-a-flood-of-syrian-victims.html>. It is clear that some people did flee: it is reported that one refugee camp, Rebeit Na’eam, “doubled in size following the chemical-weapons attack in Ghouta,” with a population of about 1500 people in December 2013. See Simone Wilson, “The Forgotten Refugees of Ghouta, Syria,” *The Jewish Journal*, December 12, 2013, <http://jewishjournal.com/news/world/125375/>.

⁹⁹ Violations Documentation Center in Syria, “Hawl Istikhdam Alsilah Alkimawy fe Mohafazat Rif Dimashq” [On the Use of Chemical Weapons in Rif Dimashq], Special Report, Violations Documentation Center in Syria, August 22, 2013, <http://vdc-sy.net/ar/> (accessed December 2015), “Motabaa limagzara Alkimaway” [A Follow-up on the Chemical Massacre], Weekly Report for 18-23 August 2013, Violations Documentation Center in Syria, <http://vdc-sy.net/ar/> (accessed December 2015).

Any morale effect from the chemical attack would have been mediated by the fact that the regime had already used massive and disproportionate force against rebels by using heavy artillery and aerial bombardment.¹⁰⁰ By the time the August attacks occurred, the population who still lived in the area were hardened by continuous and daily conflict. As mentioned above, the regime used siege tactics against the “liberated areas” of Ghouta, including marked shortages in food and medicine as well as a cut-off of electricity.¹⁰¹ According to a prominent Syrian commentator Yassin Alhaj Saleh, the use of chemical weapons was seen as tragic but a continuation of the regime’s uninhibited methods to cause destruction and death.¹⁰² The morale effect may also have been mediated by the expectation of some in the opposition that the attacks would invite international punitive action that could possibly improve conditions for the rebels and residents of the area.¹⁰³

The effect of the CW attack on refugee flows is complicated by the siege imposed by the Syrian government. Amnesty International reports that “in mid-2013, Syrian government forces began preventing civilians from entering or leaving Eastern Ghouta.”¹⁰⁴ This did not prevent some civilians from fleeing the sites of the chemical attack, but certainly increased the danger of doing so and would likely have prevented a massive exodus in response to the CW attack.¹⁰⁵ It is possible that the sarin attacks at Ghouta were intended as an example that

¹⁰⁰ A report by a local NGO produced the day after the attack refers to how the population in the area suffered from a “long siege” and “crimes of random daily bombardment.” See Violations Documentation Center in Syria, “Hawl Istikhdam Alsilah Alkimawiy fe Mohafazat Rif Dimashq.”

¹⁰¹ In addition to the sources cited above in footnote 43, see Amnesty International, “Updated Briefing on Sieges across Syria,” June 2014, <https://www.amnesty.org/download/Documents/MDE240232014ENGLISH.pdf>; Angelova, “Governance in Rebel-Held East Ghouta,” 4; Siege Watch, “First Quarterly Report on Besieged Areas in Syria,” February 2016, 21-26, <https://siegewatch.org/wp-content/uploads/2015/10/PAX-RAPPORT-SIEGE-WATCH-FINAL-SINGLE-PAGES-DEF.pdf>.

¹⁰² Yassin Alhaj Saleh, “La Jadeed fi almathbaha, Inahu alnizam” [Nothing New in the Massacre: It is the regime), *Aljumhuriya*, August 22, 2013, <https://www.aljumhuriya.net/ar/15527>.

¹⁰³ “Syrian Opposition: No Geneva Peace Talks After ‘Chemical Attack,’” *RT*, August 26, 2013, <https://www.rt.com/news/opposition-geneva-attack-syria-015/>.

¹⁰⁴ Amnesty International, “Left to Die Under Siege: War Crimes and Human Rights Abuses in Eastern Ghouta, Syria,” (London: Amnesty International, 2015), 16, <https://www.amnesty.org/en/documents/mde24/2079/2015/en/>.

¹⁰⁵ See Wilson, “The Forgotten Refugees of Ghouta, Syria,” for the stories of some who did flee Ghouta.

would prompt refugee flows from other areas, but this does not seem to have occurred. There was, and continues to be, a constant flow of refugees from Syria. On August 21, 2012, 160,616 Syrian refugees had registered; by August 31 this had increased to 199,471; and by September 30, the number of registered refugees was 251,406.¹⁰⁶ But it is difficult to determine if there is a direct link between refugee flows and the chemical attacks. The publicly available data on refugee flows captures information only from those refugees who register and does not provide the date that refugees left their homes or the place from which they fled. However, those tracking refugee flows do not highlight chemical attacks as a particularly significant cause. For example, the Migration Policy Centre of the European University Institute in Florence produces a website on Syrian refugees. They produced a timeline that includes both the number of refugees and significant events related to the Syrian Civil War. While it identifies particular events as prompting increased refugee flows (for example, it identifies IS attacks in September 2014 as sparking “a massive refugee influx into Turkey”), it does not identify any chemical weapons attacks in its timeline.¹⁰⁷

While the number of civilian deaths caused by the CW attacks at Ghouta is horrifying, it pales in comparison to the total civilian deaths in the conflict. Areas hit with CW were not cowed and did not stop their opposition to the regime—and as established above there was no significant change in territorial control. The attacks may also have been intended as a punishment that would deter opposition to the regime in other areas, but there is no evidence to suggest that this sort of effect was significant as the conflict is still ongoing.

Hama Plains

¹⁰⁶ Inter-Agency Information Sharing Portal, “Registered Syrian Refugees,” *UNHCR*, accessed August 8, 2017, <http://data.unhcr.org/syrianrefugees/regional.php>. See also UNHCR, “Population Statistics,” The UN Refugee Agency, accessed August 8, 2017, <http://popstats.unhcr.org/en/overview>.

¹⁰⁷ See Syrian Refugees, “A Snapshot of the Crisis—in the Middle East and Europe,” Timeline, *Syrian Refugees*, accessed August 8, 2017, <http://syrianrefugees.eu/timeline/>.

While the number of casualties on the Hama Plains did not approach those at Ghouta, the chlorine attacks on the Hama Plains still caused panic, as reported to the FFM by treating physicians.¹⁰⁸ However, as with Ghouta, this did not have wider military ramifications. The civilian population was hardened to the war: for example, the government had already targeted food production and used cluster bombs in the area. Even after the CW incidents on the Hama Plains, the rebels maintained enough civilian support to continue operations throughout the year.¹⁰⁹ In terms of refugee flows, the degree to which rebel controlled villages in the Hama Plains have been depopulated is unclear. For example, at the start of the war, the population of Kafr Zita was around 18,000 with the population of the district estimated at nearly 39,000 in 2004.¹¹⁰ The OPCW investigation noted a decline in the number of inhabitants, and Al-Jazeera reported that the urban population had declined to half of its pre-war totals by the end of 2012—before the use of chemical weapons-- and was down to 1/10th by the start of 2015.¹¹¹ However, an August 2014 report by OCHA claimed that there were 61,000 people living in the Kafr Zita area, although they were in dire need of humanitarian assistance. It also noted that the area was “hard to reach” (and thus verify) and that because many of those in the area were already internally displaced, they may have since moved on.¹¹² However, the August 2014 OCHA report that internally displaced people were moving to the Kafr Zita area that summer indicates that the chlorine attacks did not

¹⁰⁸ “Third OPCW-UN JIM Report,” 32.

¹⁰⁹ “Independent International Commission of Inquiry on the Syrian Arab Republic,” August 16, 2013, 22.

¹¹⁰ Syria Central Bureau of Statistics, “Nitag Te’dad Alsukan W Almasaken La’m 2004 Ala Mustawa Almadina/Karya,” [Population and housing census results for 2004 at city / village level - Hama Governorate], *Archive.is*, 2004, https://archive.is/20130112133023/http://www.cbssyr.org/new%20web%20site/General_census/census_2004/NH/TAB05-21-2004.htm#selection-29.0-29.62.

¹¹¹ Mohammed Al-Naoury-Hama, “Alhisar W Alkathf Fi Surya Yohawel Kafr Zita Ela Madinet Ashbah,” [Siege and shelling in Syria turns Kafr Zita into a ghost town], *Aljazeera*, February 18, 2015, <http://www.aljazeera.net>; see also “Third OPCW FFM Report,” 22.

¹¹² UN Office for the Coordination of Humanitarian Affairs, “Syrian Arab Republic Governorates Profiles (June 2014),” August 6, 2014, 17, <https://reliefweb.int/sites/reliefweb.int/files/resources/Syria%20governorate%20profiles%206%20August%202014.pdf>.

depopulate the region. Furthermore, the rebels continued to operate from the area, as shown by the recapture of Morek by the rebels “in a few hours” in November 2015.¹¹³

As with our examination of tactical effects, our examination of chemical weapons as a tool for civilian victimization reveals little evidence that the use of CW in this way had much utility in Syria. The contrast here with the reported effects of chemical weapons against the Kurds at the end of the Iran-Iraq War is striking, and an avenue for future research.¹¹⁴ Before turning to our conclusions, we briefly examine CW developments in Syria since the summer of 2017.

CURRENT DEVELOPMENTS

The focus of our analysis has been on the use of chemical weapons at Ghouta in 2013 and the use of chlorine in the Hama Plains during the summer of 2014. Developments since August 2014 have included the evolving role of IS in Syria and their use of CW; the airstrikes against IS by the US-led Coalition, which began September 23, 2014; and Russian intervention beginning in September 2015.¹¹⁵ Despite our findings that CW have contributed little, allegations of the use of chemical weapons (including sarin) have continued throughout this period.¹¹⁶

¹¹³ Naline Malla and Sylvia Westall, “Syrian Rebels Seize Town in West in Blow to Government,” *Reuters*, November 5, 2015, <http://www.reuters.com/article/us-mideast-crisis-syria-idUSKCN0SU0XY20151105>.

¹¹⁴ McNaugher argues the psychological effect of CW can vary by context, explaining that in “World War I combatants tended to become inured to the CW threat” while in the Iran-Iraq War, “unprotected Revolutionary Guard troops apparently rushed heedlessly into gas clouds in 1983 and 1984, but in 1988 Iranian troops equipped with masks and presumably familiar with Iraq’s use of gas of CW are said to have panicked and run.” McNaugher, “Ballistic Missiles and Chemical Weapons,” 20.

¹¹⁵ On IS use, see “Third OPCW-UN JIM Report,” 14-15, as well as Eric Schmitt, “ISIS Used Chemical Arms at Least 52 Times in Syria and Iraq, Report Says,” *New York Times*, November 21, 2016, <https://www.nytimes.com/2016/11/21/world/middleeast/isis-chemical-weapons-syria-iraq-mosul.html?mcubz=0>. According to Schmitt, at least one third of those attacks were “in and around” Mosul.

¹¹⁶ For example, data shows 22 allegations from September-December 2014, 78 in 2015, and 10 from January-March in 2016. This data was drawn from Conflict Monitor by IHS Markit, “CW Allegations Syria 2014-2016,” (accessed March 2016), and shared with us through a personal communication, April 21, 2016. The JIM has investigated eleven cases total, four of these from 2015, and the FFM investigated one further incident at Al Awamid on August 2, 2016, where it could not confirm that CW had been used. See “Report of the OPCW Fact-Finding Mission in Syria Regarding the Incident of 2 August 2016 as Reported In the Note Verbale of the Syrian Arab Republic Number 69 Dated 16 August 2016,” December 21, 2016, UNSC S/2017/45, https://www.opcw.org/fileadmin/OPCW/Fact_Finding_Mission/s-1444-2016_e_.pdf. The FFM summary report

This poses a puzzle: why would the Assad regime continue to use chemical weapons if there are no military benefits to doing so? Does the continued use of chemical weapons suggest that our analysis of utility is wrong? At the time of writing, the information necessary to examine the regime's motivation for using CW is unavailable. As mentioned, the Assad regime denies that it is using chemical weapons, and no records of discussions or decisions concerning such use is available.¹¹⁷ We can speculate about the regime's motivations for continued CW use--that it is a strategy of desperation, using everything at its disposal in order to remain in power, or that it is a signal to the rebels of the regime's determination to use any means necessary to re-establish control, or that such use has been encouraged by the rhetoric that suggests that CW is an especially effective terror weapon, or that particular episodes are a test of the international community's resolve to counter CW use.¹¹⁸ However, there is no accessible data on the regime's motivation.

for 2016 notes that it received 46 notes verbale from Syria, two of which asked it to investigate specific instances, and that the FFM recorded 65 potential incidents from open sources. The FFM has provided three additional communications to the UNSC: the "Report of the OPCW Fact-Finding Mission in Syria Regarding the Incident of 16 September 2016 as Reported in the Note Verbale of the Syrian Arab Republic Number 113 dated 29 November 2016," S/1491/2017, May 1, 2017 at https://www.opcw.org/fileadmin/OPCW/Fact_Finding_Mission/s-1491-2017_e_.pdf; "Status Update of the OPCW Fact-Finding Mission in Syria Regarding a Reported Incident in Khan Shaykhun, 4 April 2017," S/1497/2017, May 12, 2017, at https://www.opcw.org/fileadmin/OPCW/Fact_Finding_Mission/s-1497-2017_e_.pdf; and the "Report of the OPCW Fact-Finding Mission in Syria Regarding an Alleged Incident in Khan Shaykhun, Syrian Arab Republic April 2017," S/1510/2017, June 29, 2017, at https://www.opcw.org/fileadmin/OPCW/Fact_Finding_Mission/s-1510-2017_e_.pdf. See Izumi Nakaamitsu, "Briefing to Security Council on the Implementation of Security Council Resolution 2118 (2013) on the Elimination of the Chemical Weapons Programme of the Syrian Arab Republic and Update on the Activities of the OPCW-UN Joint Investigative Mechanism (JIM)," *High Representative for Disarmament Affairs United Nations*, May 23, 2017, <https://s3.amazonaws.com/unoda-web/wp-content/uploads/2017/05/HR-Briefing-Syria-23-May-2017.pdf>. Evidence of sulfur mustard was found in regard to the 2016 incident and of a sarin or sarin-like substance for the second. Reports on allegations of sarin include a report from the FFM in December 2015, which concludes that "from the results of blood sample analyses, the FFM is of the opinion that there is a high degree of probability that some of those identified as being involved in the alleged incident in Darayya on 15 February 2015 were at some point exposed to sarin or a sarin-like substance." See page 4, but note that the report is unable to link the exposure to a particular date or attack. See also "UN Says 'Possible' Sarin Used Again as Weapon in Syria," *Aljazeera*, January 6, 2016, <http://www.aljazeera.com/news/2016/01/sarin-weapon-syria-160106053715274.html>.

¹¹⁷ Gregory Koblenz has identified what he describes as Syria's "kill chain"--the chain of command involved in the production and use of chemical weapons, but his discussion does not extend to the regime's motivations for use. See Gregory Koblenz, "Syria's Chemical Weapons Kill Chain," *Foreign Policy*, April 7, 2017, <http://foreignpolicy.com/2017/04/07/syrias-chemical-weapons-kill-chain-assad-sarin/>.

¹¹⁸ For an example of such speculation, see Matthew Cancian and Sara Plana, "Rationality and Sarin Gas: What Social Science Tells Us About Assad's Chemical Weapons Attack," April 21, 2017,

While an explanation of the regime's continued use of CW must wait until evidence of regime decision making is available, it is necessary to review the use of CW in Syria since 2014 in order to see if more recent cases challenge our analysis. Several instances, that of the chlorine use in Aleppo in April 2016 and the 2017 sarin attacks at Lataminah on March 30 and Khan Sheikhoun on April 4 are particularly noteworthy, as it has been suggested that they represent a further integration of CW use into military operations.¹¹⁹ Additionally, the April 4th Khan Sheikhoun incident killed over 80 people and prompted a US military strike in response.¹²⁰ However, we argue that none of these events demonstrate military utility that will motivate other states to revise their CW policies.

Looking first at Aleppo, Human Rights Watch reports that chlorine bombs were dropped "in residential areas in Aleppo on at least eight occasions between November 17 and December 13, 2016" and that "the way chemical attacks moved in step with the frontline showed that they were an integral part of the offensive."¹²¹ While this might represent an evolution in the use of chemical weapons in the Syrian conflict, the available information suggests that the increased air power provided by the Russian intervention played a more important role in the regime's victory in Aleppo.¹²² While it has been reported that nine

<https://mwi.usma.edu/rationality-sarin-gas-social-science-tells-us-assads-chemical-weapons-attack/>; on the possibility that use in 2017 is intended as a signal of the Regime's determination, see Paul Schulte, "Chemical Weapons in Syria: Military, Political and Moral Significance and Wider International Implications of the Compliance Crisis," Discussion Paper for the Council on Christian Approaches to Defence and Disarmament, International Conference, The Netherlands, 2017.

¹¹⁹ Geoffrey Chapman and Alessandra Giovanzanti, "US Strike Fails to Stem CW Use in Syria," *Jane's Intelligence Review*, May 26, 2017, 45-46 and "Seventh UN-OPCW JIM Report," 21.

¹²⁰ Reports that 93 people were killed by chemical weapons near Palmyra in December 2016 have received less attention. See Martin Chulov and Kareem Shaheen, "International Concern over Claims of Chemical Weapon Attack in Syria," *The Guardian*, December 13, 2016, <https://www.theguardian.com/world/2016/dec/13/international-concern-over-claims-of-chemical-weapon-attack-in-syria>.

¹²¹ Human Rights Watch, "Syria: Coordinated Chemical Attacks on Aleppo," February 13, 2017, <https://www.hrw.org/news/2017/02/13/syria-coordinated-chemical-attacks-aleppo>. According to this report, the improvised munitions were delivered by helicopter, were described by some witnesses as "barrels or bombs," and used yellow gas cylinders.

¹²² Paul Torpey, Josh Holder and Kareem Shaheen, "Five Maps that Show How the Net Closed on Eastern Aleppo," *The Guardian*, November 5, 2016, <https://www.theguardian.com/global/2016/nov/05/five-maps-that-show-how-the-net-closed-on-eastern-aleppo>.

people were killed in these alleged chlorine attacks, the international reaction remained muted in response to the use of this relatively basic CW capability.¹²³

The April 4, 2017 attack at Khan Sheikhoun involved sarin and appeared to be in response to renewed fighting on the Hama Plains.¹²⁴ As with Aleppo in 2016, conventional airpower was more instrumental in reversing the rebel offensive and despite the use of sarin, Khan Sheikhoun remained under rebel control.¹²⁵ The reaction to the use of a relatively advanced CW at Khan Sheikhoun recalled the reaction to the use on Ghouta, with a session of the UNSC held the day after the alleged attack.¹²⁶ On April 6, as explained by President Donald Trump, the United States launched a “targeted military strike on the airfield in Syria from where the chemical attack was launched.”¹²⁷ While the reintroduction of sarin into the conflict raises important questions about the limits to coercive disarmament as well as about the deterrence of chemical weapons use, our focus here is on military utility and the lessons that other actors might draw about the benefits and costs of CW use.¹²⁸ Neither the use of chlorine at Aleppo nor the use of sarin at Khan Sheikhoun demonstrate much military utility.

¹²³ Human Rights Watch, “Syria: Coordinated Chemical Attacks on Aleppo.”

¹²⁴ The JIM found that the CW attack at Khan Sheikhoun was carried out by a Syrian government aircraft, which dropped an aerial bomb containing sarin. See “Seventh UN-OPCW JIM Report,” 10. According to the “Report of the Independent International Commission of Inquiry on the Syrian Arab Republic,” the attack at Lataminah also involved a warplane, not helicopters. See “Report of the Independent International Commission of Inquiry on the Syrian Arab Republic,” A/HRC/36/55, August 8, 2017, 14-16. Note that this report also states that the regime used rockets to deliver chlorine in at least one attack during the same period (see page 15).

¹²⁵ Reuters, “Syrian Army, Allies Gain Ground Against Rebels North of Hama,” *VOA*, April 23, 2017, <https://www.voanews.com/a/syrian-army-allies-gain-ground-hama/3822101.html>.

¹²⁶ See United Nations, “Chemical Weapons Attack in Syria Was Largest Such Event Since 2013, Disarmament Affairs Chief Tells Security Council,” *UN*, April 5, 2017, <https://www.un.org/press/en/2017/sc12777.doc.htm>.

¹²⁷ Office of the Press Secretary, “Statement by President Trump on Syria,” *The White House*, April 6, 2017, <https://www.whitehouse.gov/the-press-office/2017/04/06/statement-president-trump-syria>.

¹²⁸ In drawing lessons about the CWC from Syria, it is important to remember that Syria joined the CWC as a result of coercion; given that its membership was coerced, it not be surprising that Syria did not voluntarily abide by the agreement. On the second point, it has been suggested that throughout the conflict the Assad regime has “tested the waters” for CW use, escalating use only when such use escapes serious international sanction. See Chapman and Giovanzanti, “US Strike Fails to Stem CW Use in Syria,” 45-46. A similar pattern may be seen in Iran-Iraq War, with Iraq beginning its foray into chemical warfare with limited use that has been explained in part as a test of international reaction. See, for example, Jonathan Tucker, *War of Nerves: Chemical Warfare from World War I to Al-Qaeda* (Pantheon Books, 2006), 250.

These cases also continue to suggest that the use of more advanced CW will draw a stronger international response than the use of a more basic capability. Thus we argue that despite these more recent uses, the Syria case provides little motivation for other states to change their CW policies.

However, we may still see some use of chemical weapons. States with existing stockpiles may have a lower threshold for use, because they have already paid the costs associated with acquisition. Similarly, improvised weapons are relatively cheap. State leaders threatened with overthrow may use anything and everything at their disposal, even if it is of marginal or unlikely utility.¹²⁹ The difference in the response to the use of sarin versus the use of chlorine may signal a bifurcation of the CW norm, or at least a bifurcation in the willingness of the international community to take strong action to enforce the norm against chemical weapons. Because of this, some actors may decide to use more basic CW to harass and terrorize their populations, because even the limited gains from this will outweigh the international condemnation it will draw. Regimes threatened with overthrow, and/or those already ostracized from the international community, may be the most likely to judge the use of more basic CW as a gamble worth taking.

CONCLUSION

In this article, we have analyzed what lessons states will draw from Syria about the costs and benefits of using chemical weapons. In particular, will the lessons of Syria prompt states to revise their current CW policies, potentially threatening the CW norm? While the drivers of weapons proliferation and use are multifaceted and complex, we argue that in order to understand whether the Syrian case will prompt further proliferation and use of CW, it is

¹²⁹ But they may choose not to, as well. It is noteworthy that, unlike in the case of Syria, chemical weapons beyond riot control agents did not play any role in the political turmoil that engulfed Egypt and Libya during the Arab Spring. We thank an anonymous reviewer for this observation.

necessary to examine the military utility of CW as well as the international response to their use.

Our analysis has shown that, as used in Syria, CW had little military utility. While CW may have made some contribution to the fighting and while it certainly contributed to the horrors faced by civilians in the Syrian conflict, we find no evidence that it provided clear military advantages or significantly reshaped control of contested territories. Chemical weapons were also just one of many tools of civilian victimization used by the regime, and there is no evidence that chemical weapons were especially effective in this role.

The international response to the use of CW in Syria has reinforced the stigma attached to these weapons. While the international response to different CW incidents has varied, the use of chemical weapons has been condemned by all parties. In the case of the use of sarin to kill large numbers of people, strong action has been taken. State actors who seek to draw lessons from Syria will look in vain for evidence that the development and/or use of chemical weapons is worth the cost, effort and international opprobrium involved.

This means that to the extent that the Syrian case inspires further proliferation and/or use, it is most likely to take place among states who are already outside of the CWC, and/or who face an existential threat, and/or who already possess chemical weapons. Even here, the international response to the use of sarin in Syria underscores the costs that may be imposed if more advanced CW are used. Thus, on the basis of our analysis, there is no reason to believe that the Syrian case will lead to significant further proliferation and use that will unravel the CW taboo.

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Table One: Hama Plains attacks in 2014 investigated by the FFM

	Chemical Attacks	Location
April:	11	3 attacks in the village of Al Tamanah, 2 attacks in the village of Talmenes 6 attacks in Kafr Zita and its neighborhood
May:	6	2 attacks in Al Tamanah, 4 attacks in Kafr Zita
June, July and August:	4	All in and around Kafr Zita